

# Impact of online class service quality on students' satisfaction on Post COVID-19: Evidence from selected self-financing Engineering Institutionss

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## Abstract

The present study was conducted to investigate the Impact of online class service quality on students' satisfaction on Post COVID-19: Evidence from selected self-financing Engineering Institutions. Aim of the study: Education is one and the main important basic services to develop and grow the economy. To face the current COVID-19 pandemic situation, in India all the segments of the adopt online class practices to provide uninterrupted education to students. The main objective of the paper is to find the impact of self-financing engineering institutions' online class service quality on students' satisfaction. Assurance, reliability, responsiveness, empathy, and tangibility are the dimension taken from the SERVQUAL framework. This paper tries to suggest a solution in the required service quality dimensions to improve the performance of online class service quality. Research design and Methodology: The study adopted an explanatory research design. Anna University-affiliated self-financing engineering institutions in the Vellore zone have been analyzed by conducting a convenience sampling survey. Correlation and Regression statistical tools were employed with the help of SPSS software to get the results. Findings and Conclusion: Overall the results of the study showed that, through the regression analysis, it is observed that the responsiveness dimension of service quality produced the highest significant result followed by reliability and tangibility achieved significant statistics in the online service quality dimension on student satisfaction.

**Keywords:** Online class, Reliability, service quality, Technology, students' satisfaction.

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## 1. Introduction

Planning is essential for every systematic organizing activity, without planning it is not good to anticipate the expected outcome. In some critical situations, all and effective strategic matters become worthless because of uncertainty. Corona Virus Infectious

Disease – 19 (COVID 19) is treated as an unexpected one and it spoils strategic and causation matters of all the industries in the world economy and precludes the importance of the effectuation decision making to the edupreneurs in the education industry. The economy in India is stagnating now due to the COVID-19 lockdown and

closes of major industries, worldwide not only in the developing economy also other categories of the economy suffering in agricultural, manufacturing, and tertiary sector. School and college closures and its impact on learning portray the need to identify the alternative ways of conventional class to facilitate learning for affected learners. BYJU's in India, Tencent classroom in China, Lark in Singapore, Ding Talk from Alibaba's distance learning solution, and Bitesize daily in the UK are the platforms offering online education amid the COVID-19 critical situation.

In India, the COVID-19 lockdown on schools, colleges, and universities, students are forced to stay inside the home. In the COVID-19 pandemic situation, various e-learning platforms assured students to achieve their learning goals. Toppr, Vedantu, Khan academy, GuruQ, IGNOU, Unacademy, Coursera, Udemy, Oliveboard, Henry Harvin, and Byju's are the familiar platforms in India are offering different courses and subjects through online. The University Grants Commission (UGC), central government, and various state government authorities of education in India advised colleges and universities to move online classes for uninterrupted education amid COVID-19. In India, the top educational institutes like Netaji Subhas University of Technology (NSIT), Jamia Millia Islamia (JMI), Jawaharlal Nehru University (JNU), Delhi University (DU), and Indian Institute of Technology Delhi (IIT-D) and Anna University stopped their offline mode of operations and started on-line classes

and online teaching-learning mode after March 2020.

## 1.2 Background of the study

Researches on service quality and student satisfaction were studied extensively in the conventional educational environment (Martinez-Arguelles and Batalla-Busquets, 2016). Improvements in existing technology and the advancement of information and communication technology bring desired changes to every industry it includes higher education (Chow and Shi, 2014). The digital education environment enhances e-learning opportunities to the students and faculty members of the higher educational institutions (Sarabadani et al., 2017; Wu, 2016; Tsai et al., 2013). Online education is treated as an innovative approach to providing educational services with the help of information and communication technology and enhances the knowledge and skills of learners without any interruptions (Fazlollahtabar and Muhammadzadeh, 2012). With the proper assistance of the internet along with the support of information and communication technology, both learning and teaching happen in online educational services (Beqiri et al., 2010). E-learning and online education bring many benefits to the stakeholders of educational institutions it includes a substantial reduction of cost on physical infrastructures, transferring economy as a digitally knowledgeable society, fast and simple way of knowledge sharing activities ( Bhuasiri et al., 2012; Taylor, 2007; Arbaugh, 2005). Universities' effort on online education brings

opportunities to integrate their activities with the global educational environment (Lee, 2010). E-learning facilitates the students to achieve their learning objectives in the simplest and fastest way via mobile or computer devices with the help of the internet (Kilburn et al. , 2014; Bhuasiri et al., 2012). E-Learning is an alternate method of physical campus; hence students no need to involve conventional mode and offline classes on campus. Many studies examined the impact of service quality on student satisfaction in traditional learning environmental settings (Parves and Hoyin, 2003). Existing studies reported that there exists a significant effect of online education service quality on customer satisfaction (Pham et al., 2018; Peng and Samah, 2006). It is noted that researches on the e-learning service quality and its impact on customer satisfaction are conducted more in the developed countries (de souza Meirelles et al., 2014; Martinez-Arguelles et al., 2013).

COVID-19 disrupted all the sectors in India it includes the education segment hence in India majority of the higher educational institutions put more effort into online classes to facilitate a smooth and uninterrupted learning environment amid the COVID-19 pandemic situation. Anna University in Tamilnadu advised its affiliated institutions to conduct online classes and the same treated as an effectuation decision-making process to ensure an uninterrupted learning process to the students. The main aim of the present study is to find the impact of online class service quality on student

satisfaction with special reference selected self-financing engineering institutions in the Vellore zone.

## 2. Review of literature

Effective service quality is depending on the involvement of consumers and the service providing organization. Functional quality and technical quality are important elements to determine service quality (Gronross, 1984). Nordic model of service quality by Gronroos (1984), Gap theory of service quality and its effort on SERVQUAL model by Parasuraman et al., (1985), Attribute model of service quality by Haywood-Farmer (1988), Synthesized model of service quality by Brogowickz et al. (1990), Performance only model of service quality by Cranin and Taylor (1992), Ideal value model of service quality by Mattson (1992), Information technology service alignment model by Berkley and Gupta (1994), Overall effect model of service quality by Dabholkar (1996), Perceived quality and satisfaction model by Spreng and Mackoy, (1996), Hierarchical also called Pivotal, Core and Peripheral (PCP) model of service quality by Philip and Hazlett (1997), Value perceived model of service quality by Sweeney et al., (1997), Internal service quality model by Frost and Kumar, (2000), Data envelope analysis or internal service quality model by Soteriou and Stavrinides, (2000), Information Technology based model by Zhu et al., (2002), e-service quality model by Santos, (2003) are the various important service quality models and researchers can prefer any of the service quality model in the future research

according to the study need and objectives (Seth et al., 2005). Many researchers adopted Parasuraman et al., (1985) SERVQUAL model of service quality to measure service quality for the study on various industries. SERVQUAL model of service quality which includes five important dimensions of service quality it is popularly known as RATER i.e., reliability, assurance, tangibles, empathy, and responsiveness. Hence the current study adopted the RATER service quality dimensions to measure service quality.

According to Oliver, (1980) satisfaction is "an evaluation of perceived discrepancy between prior expectations and the actual performance of the product". Various service quality models identified in the study were linked to the relationship between the dimensions of service quality and customer satisfaction (Seth et al., 2005). The current study students are treated as a customer, rather than mention customer satisfaction it is mentioned as student satisfaction with the strong literature support such as Pham et al., 2019.

E-learning service quality attributes such as course material quality, e-learning instructor, and e-learning system quality have a direct effect on students' satisfaction in Vietnam (Pham et al., 2019). The comparative study conducted in the topic of online support service quality and student satisfaction study revealed that there was a significant difference found between the US and Korea students to the service quality of online education,

along with the logistic regression found that online support service quality perception acted as a predictor on students satisfaction for both the US and Korean context (Lee 2010). Through the existing literature, it has been found that very limited studies were available to link the variables of service quality dimensions on student satisfaction in e-learning and online classes in Indian settings.

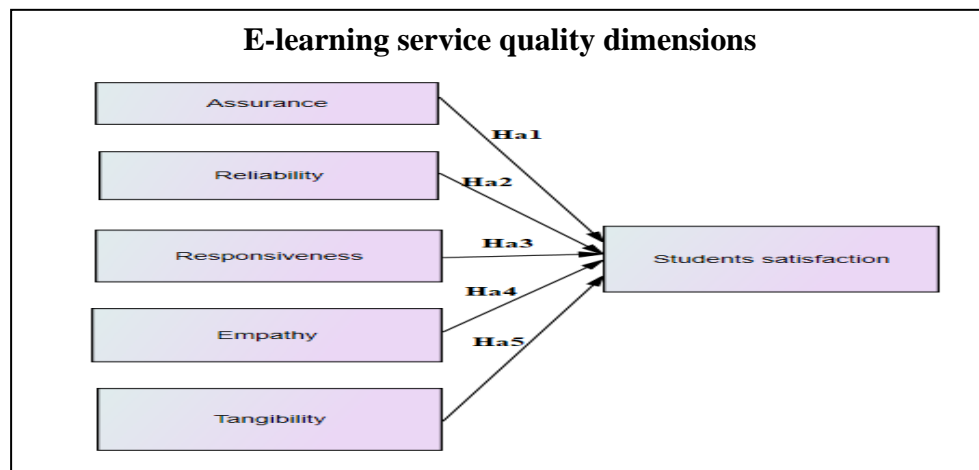
To meet learners' real learning needs and create an effective learning environment, a growing body of literature have been conducted to examine various determinants of learner's online satisfaction (Shen et al., 2013; Hew et al., 2020; Jiang et al., 2021).

Baber (2020) performed a comparative analysis to investigate the determinants of students' learning satisfaction on undergraduate students from South Korea and India. The study discovered that the variables such as interaction in the classroom, student engagement, course structure, teacher awareness, and facilitation positively influence students' perceived learning satisfaction. Other factors, such as online support service quality, perceived ease of use and usefulness of online platform, computer self-efficacy, academic self-efficacy, prior experience, and online learning acceptance, were found to significantly impact students' online learning satisfaction (Lee, 2010; Jan, 2015; Jiang et al., 2021; Priyadarshini et al., 2023).

### 3. Research methodology

Services quality dimensions such as assurance, reliability, responsiveness, empathy, and tangibility were identified to measure E-learning service quality from the Parasuraman et al., 1985 services quality model. The study model has shown in figure 3.1. Assurance, reliability, responsiveness, empathy, and tangibility are the service quality dimensions took in the study to measure online class service quality and the same treated as independent variables. Students' satisfaction is treated as a dependent variable of the study. Through the exiting literature it has understood the meaning of service quality dimensions, the present study redefined the meaning of services quality according to the purpose of research on online class, assurance is knowledge and civility of faculty

members taking an online class; reliability is the capability to deliver online class service as promised; responsiveness is prompt delivery of online education services to the students; tangibility is an outlook of online class resources and communication resources; empathy is providing online education resources according to the student needs. Systematized questionnaires were used to obtain fair results; items to measure service quality and student satisfaction have been adopted from Ayuni and Mulyana (2019). According to the need of the study in the questionnaire, some modifications have done in the existing scales to match service quality and student satisfaction concerning the online class. Five points Likert scale were 1 represents strongly disagree and 5 represents strongly agree used in the questionnaire.



**Figure 1:** Conceptual Framework

#### 3.1 Hypotheses of the study

Based on the conceptual framework shown in figure 3.1 the research hypotheses are

Ha1: Assurance has a significant effect on student satisfaction in the online class.

Ha2: Reliability has a significant effect on student satisfaction in the online class.

Ha3: Responsiveness has a significant effect on student satisfaction in the online class.

Ha4: Empathy has a significant effect on student satisfaction in the online class.

Ha5: Tangibility has a significant effect on student satisfaction in the online class.

Ha6: Assurance, Reliability, Responsiveness, Empathy, Tangibility have a significant effect on student satisfaction in the online class.

### 3.2 Research design and sampling

The main aim of the study is to connect the ideas and recognize the relationship among the variables hence the study adopted an explanatory research design. The study depended on a primary data source; e- survey questionnaire method was used to collect the responses. Due to time limitations and the COVID-19 pandemic situation, the study adopted a

non-probability and convenience sampling procedure. 384 valid responses took for data analysis out of 421 responses received. Regression and correlation statistical tools were employed to determine the significance level of the variables individually and the model shown in figure 3.1 in the online class.

The regression equation for the model is

$$SS_{EL} = \alpha + \beta_1 X_{\text{assurance}} + \beta_2 X_{\text{reliability}} + \beta_3 X_{\text{responsiveness}} + \beta_4 X_{\text{empathy}} + \beta_5 X_{\text{tangibility}} + e$$

Where, SS = Student satisfaction; EL = E-learning;  $\alpha$  = constant;  $\beta$  = coefficient to estimate; e= error term

### 4. Data analysis and interpretation

The Present study majority of the students (56%) were male; the majority of the students were studying (82%) UG, Majority of the students (45%) were using Google meet platform for learning purposes. Descriptive analysis revealed that students were satisfied with the service quality dimensions of e-learning.

**Ha1: Assurance has a significant effect on student satisfaction in the online class.**

**Table 4.1.1 Correlations**

		Student satisfaction	Assurance
Student satisfaction	Pearson Correlation	1	.691**
	Sig. (2-tailed)		.000
	N	384	384
Assurance	Pearson Correlation	.691**	1
	Sig. (2-tailed)	.000	
	N	384	384

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

**Table 4.1.2 ANOVA**

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	89.509	1	89.509	349.527	.000
Residual	97.825	382	.256		
Total	187.333	383			

Note: a. Dependent Variable: Student satisfaction, b. Predictors: (Constant), Assurance

**Table 4.1.3 Coefficients**

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.097	.150		7.307	.000
	Assurance	.703	.038	.691	18.696	.000

Note: a. Dependent Variable: Student satisfaction

It is inferred from the above table 4.1.1, the significance value of 0.000 and correlation value of 0.691 illustrates the positive correlation between assurance and student satisfaction, table 4.1.2 illustrates with the F-value 349.727 depicting the model is significant. The

obtained t value from the table 4.1.3 is 7.307 and significance value is 0.000. Thus statistical results explained to accept the hypotheses of **Ha1: Assurance has a significant effect on student satisfaction in the online class.**

**Ha2: Reliability has a significant effect on student satisfaction in the online class.**

**Table 4.2.1 Correlations**

		Student satisfaction	Reliability
Student satisfaction	Pearson Correlation	1	.700**
	Sig. (2-tailed)		.000
	N	384	384
Reliability	Pearson Correlation	.700**	1
	Sig. (2-tailed)	.000	
	N	384	384

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

**Table 4.2.2 ANOVA**

Model	Sum of Squares	df	Mean Square	F	Sig.
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1	Regression	91.871	1	91.871	367.627	.000
	Residual	95.463	382	.250		
	Total	187.333	383			

Note: a. Dependent Variable: Student satisfaction, b. Predictors: (Constant), Reliability.

**Table 4.2.3 Coefficients**

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.148	.144		7.986	.000
	Reliability	.705	.037	.700	19.174	.000

Note: a. Dependent Variable: Student satisfaction

It is inferred from the above table 4.2.1, the significance value of 0.000 and correlation value of 0.700 illustrates the positive correlation between the reliability dimension online class service quality and student satisfaction, table 4.2.2 illustrates with the F-value 367.627 depicting the

model is significant. The obtained t value from the table 4.2.3 is 7.986 and significance value is 0.000. Thus, results explained to accept the hypotheses of **Ha2: Reliability has a significant effect on student satisfaction in the online class.**

**Ha3: Responsiveness has a significant effect on student satisfaction in the online class.**

**Table 4.3.1 Correlations**

		Student satisfaction	Responsiveness
Student satisfaction	Pearson Correlation	1	.799**
	Sig. (2-tailed)		.000
	N	384	384
Responsiveness	Pearson Correlation	.799**	1
	Sig. (2-tailed)	.000	
	N	384	384

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

**Table 4.3.2 ANOVA**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	119.688	1	119.688	675.888	.000



Residual	67.645	382	.177
Total	187.333	383	

Note: a. Dependent Variable: Student satisfaction, b. Predictors: (Constant), Responsiveness

**Table 4.3.3 Coefficients**

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.256	.103		12.249	.000
	Responsiveness	.675	.026	.799	25.998	.000

Note: a. Dependent Variable: Student satisfaction

It is inferred from the above table 4.3.1, the significance value of 0.000 and correlation value of 0.799 illustrates the positive correlation between responsiveness and student satisfaction, table 4.3.2 illustrates with the F-value 675.888 depicting the model is

significant. The obtained t value from the table 4.3.3 is 12.249 and significance value is 0.000. Thus, results explained to accept the hypotheses **Ha3: Responsiveness has a significant effect on student satisfaction in the online class**

**Ha4: Empathy has a significant effect on student satisfaction in the online class**

**Table 4.4.1 Correlations**

		Student satisfaction	Empathy
Student satisfaction	Pearson Correlation	1	.559**
	Sig. (2-tailed)		.000
	N	384	384
	Pearson Correlation	.559**	1
Empathy	Sig. (2-tailed)	.000	
	N	384	384

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

**Table 4.4.2 ANOVA**

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	58.571	1	58.571	173.764	.000
	Residual	128.762	382	.337		
	Total	187.333	383			

Note: a. Dependent Variable: Student satisfaction, b. Predictors: (Constant), Empathy

**Table 4.4.3 Coefficients**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.995	.145		13.787	.000
	Empathy	.509	.039	.559	13.182	.000

a. Dependent Variable: Student satisfaction

It is inferred from the above table 4.4.1, the significance value of 0.000 and correlation value of 0.559 illustrates the positive correlation between empathy and student satisfaction, the above table 4.4.2 illustrates the F-value 173.764 depicting

the model is significant. The obtained t value from the table 4.4.3 is 13.787 and significance value is 0.000. Thus, results explained to accept the hypotheses of **Ha4: Empathy has a significant effect on student satisfaction in the online class.**

**Ha5: Tangibility has a significant effect on student satisfaction in the online class**

**Table 4.5.1 Correlations**

		Student satisfaction	Tangibility
Student satisfaction	Pearson Correlation	1	.370**
	Sig. (2-tailed)		.000
	N	384	384
Tangibility	Pearson Correlation	.370**	1
	Sig. (2-tailed)	.000	
	N	384	384

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

**Table 4.5.2 ANOVA**

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	25.682	1	25.682	60.689	.000
	Residual	161.651	382	.423		
	Total	187.333	383			

Note: a. Dependent Variable: Student satisfaction, b. Predictors: (Constant), Tangibility.

**Table 4.5.3 Coefficients**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.443	.185		13.197	.000
	Tangibility	.354	.045	.370	7.790	.000

Note: a. Dependent Variable: Student satisfaction

It is inferred from the above table 4.5.1, the significance value of 0.000 illustrates the positive correlation between tangibility and student satisfaction, table 4.5.2 with the F-value 60.689 depicting the model is significant. The obtained t value from

the table 4.5.3 is 13.197 and significance value is 0.000. Thus, results explained to accept the hypotheses of Ha5: Tangibility has significant effect on student satisfaction in online class.

**Ha6: Assurance, Reliability, Responsiveness, Empathy, Tangibility have a significant effect on student satisfaction in the online class.**

**Table 4.6.1 Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.844 <sup>a</sup>	.712	.709	.37755

Note: a. Predictors: (Constant), Empathy, Tangibility, Responsiveness, Assurance, Reliability

**Table 4.6.2 ANOVA**

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	133.452	5	26.690	187.245	.000
Residual	53.881	378	.143		
Total	187.333	383			

Note: a. Dependent Variable: Student satisfaction

b. Predictors: (Constant), Empathy, Tangibility, Responsiveness, Assurance, Reliability.

**Table 4.6.3 Coefficients**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.367	.139		2.643	.009
	Reliability	.235	.049	.233	4.819	.000
	Responsiveness	.451	.034	.534	13.165	.000
	Assurance	.086	.047	.085	1.847	.065
	Tangibility	.078	.030	.081	2.576	.010
	Empathy	.055	.038	.060	1.453	.147

Note: a. Dependent Variable: Student satisfaction

Table 4.6.1 explained the overall predictability of the model. The adjusted R-square value is 0.709 indicated that the overall predictability of the model. Table 4.6.2 shown the F

value is 187.245 and significance value is 0.000, hence there is a significant correlation between independent and dependent variables. Obtained F value (187.245) and significance value

clarified that the data and model fit in student satisfaction in E-learning. Table 4.6.3 presented the coefficient analysis and the relationship between independent variables i.e., e-learning service quality dimensions such as assurance, reliability, responsiveness, empathy and tangibility on dependent variable student satisfaction. The obtained t value statistics of reliability, responsiveness, and tangibility exceeded the value of 2 described that they have significant relation with student satisfaction. Beta value explained that the responsiveness dimension obtained most significant results. Assurance and empathy did not generate significant result in coefficient table. However correlation result explained that all the online class service quality dimensions related positively with the students satisfaction. The obtained t value is 2.643 and

## 5. Discussion and conclusion

It is observed from the statistical tools students are fairly satisfied with the e-learning service quality dimensions. Correlation analysis on individual independent variables (Assurance, reliability, responsiveness, empathy, and tangibility) with the dependent variable (student satisfaction) explained that there exists a positive relationship between the variables. Result of regression analysis, it is observed that the responsiveness dimension of service quality produced the highest significant result followed by reliability and tangibility achieved significantly in the online class service quality dimensions, and online class service quality acted as a predictor of student satisfaction, the same results can

significance value is 0.009, thus statistical results explained to accept the hypotheses of Ha6: **Assurance, Reliability, Responsiveness, Empathy, and Tangibility have a significant effect on student satisfaction in the online class.**

The regression equation generated through the results obtained in the table 4.6.3

$$SS_{EL} = 0.367 + 0.086X_{assurance} + 0.235X_{reliability} + 0.451X_{responsiveness} + 0.055X_{empathy} + 0.078X_{tangibility} + 0.337$$

Hence the hypotheses **Ha6: Assurance, Reliability, Responsiveness, Empathy, Tangibility have significant effect on student satisfaction in the online class** is accepted.

see the previous studies of Ayuni and Mulyana, (2019); Martinez et al., (2016).

The study will help the management of self-financing engineering institutions to concentrate online class service quality when they involve in the effectuation decision-making process especially in the critical situation like the kind of COVID-19 pandemic situation. To achieve online class service quality it is suggested to the institutions need to do some arrangements on helpline services for the students regard online class, prompt and new information dissemination regard online class, secured and trusted online meeting platform arrangements for an online class are very important to the institutions.

## 5. Limitations and scope for the further study

Smaller sample size, sampling design, statistical tools, respondents participated in the survey is self-financing engineering institutions students in the Vellore region are the various limitation in the study, and these restrictions not able to accept the generalization of the study. Focus on larger sample size, some other sampling design, the addition of e-service quality dimension may researchers can concentrate in the same area for the further study will enhance the performance of online class service quality on student satisfaction.

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## Conflict of interest

The authors declare that they have no conflicts of interest.

## References

- Arbaugh, J. B. (2005). Is there an optimal design for on-line MBA courses? *Academy of Management Learning & Education*, 4(2), 135-149.
- Ayuni, D., & Mulyana, A. (2019). Applying service quality model as a determinant of success in E-learning: The role of institutional support and outcome value. *Review of Integrative Business and Economics Research*, 8, 145-159.
- Beqiri, M. S., Chase, N. M., & Bishka, A. (2009). Online course delivery: An empirical investigation of factors affecting student satisfaction. *Journal of Education for Business*, 85(2), 95-100.
- Bhuasiri, W., Xaymoungkhoun, O., Zo, H., Rho, J. J., & Ciganek, A. P. (2012). Critical success factors for e-learning in developing countries: A comparative analysis between ICT experts and faculty. *Computers & Education*, 5
- Chow, W. S., & Shi, S. (2014). Investigating students' satisfaction and continuance intention toward e-learning: An Extension of the expectation – confirmation model, *Procedia -Social and Behavioral Sciences*, 141, 1145-1149.
- De Souza Meirelles, F., Filenga, D., & Brugnolo Filho, M. (2014). Student Satisfaction Process in Virtual Learning System: Considerations Based in Information and Service Quality from Brazil's Experience. *Turkish Online Journal of Distance Education*, 15(3), 122-142.
- Farooq, M. S., Chaudhry, A. H., Shafiq, M., & Berhanu, G. (2011). Factors affecting students' quality of academic performance: A case of secondary school level. *Journal of Quality and Technology Management*, 7, 1–14.
- Fazlollahtabar, H., & Muhammadzadeh, A. (2012). A knowledge-based user interface to optimize curriculum utility in an e-learning system. *International*

- Journal of Enterprise Information Systems (IJEIS), 8(3), 34-53.
- Fredericksen, E., Shea, P., & Pickett, A. (2000). Factors influencing student and faculty satisfaction in the SUNY learning network. State University of New York.
- Gold, S. (2011). A constructivist approach to online training for online teachers. *Journal of Aysnchronous Learning Networks*, 5(1), 35–57.
- González-Gómez, D., Jeong, J. S., & Rodríguez, D. A. (2016). Performance and perception in the flipped learning model: An initial approach to evaluate the effectiveness of a new teaching methodology in a general science classroom. *Journal of Science Education and Technology*, 25(3), 450–459.
- Gorgodze, S., Macharashvili, L., & Kamladze, A. (2020). Learning for earning: Student expectations and perceptions of university. *International Education Studies*, 13(1), 42–53.
- Gronroos, C. (1984). A service quality model and its marketing implications.
- Jenkins, D. M. (2015). Integrated course design: A facelift for college courses. *Journal of Management Education*, 39(3), 427–432.
- Kauffman, H. (2015). A review of predictive factors of student success in and satisfaction with online learning. *Research in Learning Technology*, 23.
- Khan, N. U. S., & Yildiz, Y. (2020). Impact of intangible characteristics of universities on student satisfaction. *Amazonia Investiga*, 9(26), 105–116.
- Kilburn, A., Kilburn, B., & Cates, T. (2014). Drivers of student retention: System availability, privacy, value and loyalty in online higher education. *Academy of Educational Leadership Journal*, 18(4), 1.
- Kinicki, A. J., Prussia, G. E., Wu, B. J., & McKee-Ryan, F. M. (2004). A covariance structure analysis of employees' response to performance feedback. *Journal of Applied Psychology*, 89(6), 1057–1069.
- Kline, R. B. (2005). *Principles and practice of structural equation modeling* (2nd ed.). The Guilford Press.
- Lee, J. W. (2010). Online support service quality, online learning acceptance, and student satisfaction. *The internet and higher education*, 13(4), 277-283.
- Martínez-Argüelles dan J.-M. Batalla-Busquets (2016). "Perceived Service Quality and Student Loyalty in an Online University." *The International Review of Research in Open and Distributed Learning*, 17. (4).
- Martínez-Argüelles, M. J., Callejo, M. B., & Farrero, J. M. C. (2013). Dimensions of perceived service quality in higher education virtual learning environments. *International Journal of Educational Technology in Higher Education*, 10(1), 268-285.
- Oliver, R. L. (1980). A cognitive model of the antecedents and consequences of satisfaction decisions. *Journal of marketing research*, 17(4), 460-469.

- Ozkan, S., & Koseler, R. (2009). Multi-dimensional students' evaluation of e-learning systems in the higher education context: An empirical investigation. *Computers & Education*, 53(4), 1285-1296.
- Parves, S., & Ho, Y. W. (2013). Antecedents and consequences of service quality in a higher education context. A qualitative research approach. *Quality Assurance in Education*, 21(1), 70-95.
- Peng, P. J., & Samah, A. (2006). Measuring students' satisfaction for quality education in e-learning university. *Unitar E Journal*, 2(1), 11-21.
- Pham, L., Limbu, Y. B., Bui, T. K., Nguyen, H. T., & Pham, H. T. (2019). Does e-learning service quality influence e-learning student satisfaction and loyalty? Evidence from Vietnam. *International Journal of Educational Technology in Higher Education*, 16(1), 7.
- Pham, L., Williamson, S., & Berry, R. (2018). Student perceptions of e-learning service quality, e-satisfaction, and e-loyalty. *International Journal of Enterprise Information Systems (IJEIS)*, 14(3), 19-40.
- Priyadarshini V, Ahmed MS, Sathya R, Koteeswari D, Ragothaman S. (2023) Direct Test Effect of Disruptive Technology Acceptance Model (DTAM) on Massive Online Open Courses (MOOCS) Learners' Satisfaction. *Indian Journal of Science and Technology*. 16(8): 590-597.
- Ramayah, T., & Lee, J. W. C. (2012). System characteristics, satisfaction and e-learning usage: a structural equation model (SEM). *Turkish Online Journal of Educational Technology-TOJET*, 11(2), 196-206.
- Sarabadani, J., Jafarzadeh, H., & ShamiZanjani, M. (2017). Towards Understanding the Determinants of Employees' E-Learning Adoption in Workplace: A Unified Theory of Acceptance and Use of Technology (UTAUT) View. *International Journal of Enterprise Information Systems (IJEIS)*, 13(1), 38-49.
- Seth, N., Deshmukh, S. G., & Vrat, P. (2005). Service quality models: a review. *International journal of quality & reliability management*.
- Taylor, P. S. (2007). Can clickers cure crowded classes. *Maclean's*, 120(26/27), 73.
- Tsai, C. W., Shen, P. D., & Chiang, Y. C. (2013). The application of mobile technology in e-learning and online education environments: a review of publications in SSCI-indexed journals from 2003 to 2012. *International Journal of Enterprise Information Systems (IJEIS)*, 9(4), 85-98.
- Wu, B. (2016). Identifying the influential factors of knowledge sharing in e-learning 2.0 systems. *International Journal of Enterprise Information Systems (IJEIS)*, 12(1), 85-102.