

The e-Learning Quality Model to Examine Students' Behavioral Intention to Use Online Learning Platform in a Higher Education Institution

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Abstract-The paper aims at understanding the behavioral intentions of students in using e-learning in a public university in Indonesia. We apply the e-learning quality model to observe the quality factors that trigger intentions. The quality factors include assurance, empathy, responsiveness, reliability, and website content. Understanding how these quality learning factors may affect a student's behavior intention to use e-learning is important to bring e-learning implementation success. We collected 502 responses from university students at a public university in Indonesia that implements a Moodle-based e-learning platform – namely ShareITS. Out of 5 (five) quality learning factors, we found only 2 (two) that significantly affect the e-learning quality – i.e., responsiveness and website content. The result shows that the teacher-student engagement in the e-learning platform and also the better visual design of ShareITS can improve the quality of the e-learning platform.

Keywords: behavioral intention, e-learning, higher education, learning quality model, service quality

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1. Introduction

E-learning is a symbol of modernized education in the world. Specifically, during the Covid-19 pandemic faced by people all over the world, unavoidably has changed the commonly found learning practices into learning at home. At last, e-learning becomes the last resort to learn at home, specifically designed to support the learning process [1].

Institut Teknologi Sepuluh Nopember (ITS) is one of the higher education institutions in Surabaya City, East Java Province, Republic of Indonesia, that has long been adopting e-learning in Moodle Platform called ShareITS since 2006 [2]. The Moodle-based ShareITS offers various features or services supporting modern education processes, given the lecturing and evaluation or assessment. The ShareITS users expect to run courses effectively using the platform [3].

To maintain the quality of the learning process, the quality of media instruction needs to improve during the course delivery. The e-learning quality will be perceived as a "good quality" when the quality of information presented in the e-learning program is of high quality, and the frequency of its adoption is relatively prominent. These two indicators will help the students to optimize the lecturing processes [4].

Meanwhile, the frequency of adoption of e-learning in ITS from 2006 to 2017 was found lagging as the percentage of users was only 41% [5]. Such a low percentage of ShareITS utilization is a challenge faced by ITS at present, and as e-learning utilization concerns with quality aspects, it is necessary to identify the e-learning service quality.

The research was to identify the service quality of ShareITS that is supposed to be an effective lecturing media. Among several findings from the previous research using ShareITS as a case study revealed that from the lecturer's perspective, it is relatively not handy to deliver courses using ShareITS [5]. The results from observation with 70 lecturers in ITS highlighted that only about 23% utilized ShareITS, and only two of the five hypotheses were accepted. The research suggested that the desire to adopt e-learning was concerned with benefits from an online learning process. There was another accepted hypothesis, i.e., the one concerning unfairness perceived by lecturers delivering e-learning in terms of rewards that significantly affect the sustainability of e-learning adoption. Such a threat needs to be well managed by the decision-makers in online lecturing programs so that ShareITS can be consistently optimized to face the advancing digital era.

Besides, this research is consistent with the ongoing

plan to develop ShareITS into a MOOC-Based e-learning System. Accordingly, the quality of ShareITS needs to be precisely measured as it will be used as a basis for preparing the MOOC implementation preparation. There have been many failures in implementing MOOC [6]. However, the focus of the previous works was mainly aiming at finding factors and causes to adopt ShareITS based on behavioral intention and acceptance analysis using the technology acceptance model, i.e., TAM and UTAUT [3], [7]. This study will focus on the implementation of the e-learning quality (eLQ) model to identify e-learning service quality and find out whether or not there is a relationship between quality and behavioral intention [8] in order to be able to give recommendations as constructive inputs to preparation of MOOC implementation.

The adopted eLQ Model refers to the concept of e-service quality to assess services using the internet [9]. E-service quality focuses on web-based service quality based on dimensions of expectation, hope, and perception of customers in operational processes and analysis on customers' satisfaction in an electronic business environment [10]. The eLQ model proposed a concept of e-service quality assessment and adopted the concept into the e-learning quality employing the e-learning quality model [11].

This research aims at identifying the e-learning service quality of ShareITS and analyze the relationship between e-learning service quality and behavioral intention through the application eLQ model in the perspectives of e-learning service users. Indeed, the model used in this research is none other than to measure the success of ICT implementation, such as an ISSM model yet in the context of education and Delone and McLean's IS success model as well [12]. Besides, previous research has even developed a quality gate instrument to support the successful implementation of e-learning in educational institutions [13]. However, this research focuses not on technology but also focuses on the aspects of the quality of e-learning services.

In [11], there are variables of web content, assurance, responsiveness, reliability, empathy, e-Learning Quality, satisfaction [14], and behavioral intention. However, in this study, the researcher modified the eLQ model by deleting the dimension of satisfaction since it is preferred that mandatory use concept in information system adoption to focus on the measurement of e-learning quality respected to behavioral intention. On the one hand, user participation and involvement are essential predictors of voluntary use system; but on the other hand, user participation and involvement would seem less important in the mandatory use system than in the voluntary use system. Therefore, the user satisfaction which would need more user participation and involvement will not be considered in this research.

The research hypothesis was formulated to identify the relations among independent, intervening, and dependent variables. Based on the research model, the variables, indicators, and statements were constructed in order to measure the e-learning service quality through

ShareITS. The variables in the eLQ Model comprised of independent, intervening, and dependent variables with statement items. These items later derived structured questionnaires.

2. Methods

This section discusses the method adopted in the research. There are four main phases, i.e., the preparation phase, the data collection phase, the data analysis phase, and the research result interpretation phase. The last also covers recommendations to e-learning service in order to improve online lecturing quality. Those four phases are then summarized in two phases, i.e., the designing phase and the implementation phase.

a. Designing Phase

In this phase, there were two main processes, i.e., conceptual model design and data collection. The conceptual model was designed to determine the conceptual method to adopt and guides during the model conformity test in the research focuses on the learning or education sector [15]. The conceptual model served as a reference during the research that has been adopted from the eLQ model [11].

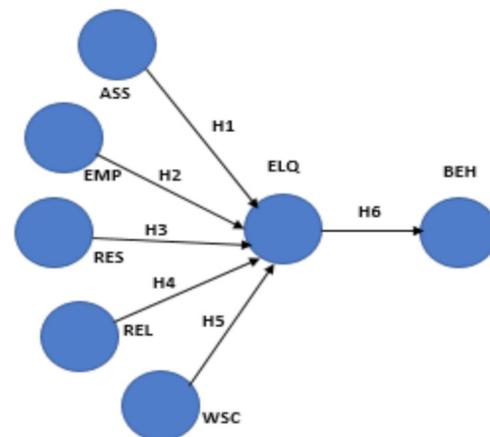


Figure 1. Research Hypotheses on eLQ Model

Fig. 1 shows that the research was to prove six hypotheses (H1 through H6) containing seven observation dimensions, as depicted in Table 1. The hypotheses are:

- H1:** Assurance has a significant positive relationship to the e-learning quality.
- H2:** Empathy has a significant positive relationship to the e-learning quality.
- H3:** Responsiveness has a significant positive relationship to the e-learning quality.
- H4:** Reliability has a significant positive relation to the e-learning quality.
- H5:** Website Content has a significant positive relation to e-learning quality.
- H6:** E-learning quality has a significant positive relationship to behavioral intention.

Table 1. The Description for Each Hypothesis

Dimensions	Code	Definitions
Behavioral Intention	BEH	This variable is for identifying the behavioral intention of e-learning utilization [16].
e-Learning Quality	ELQ	This variable is used for measuring web service quality and has been developed in previous research. It represents the whole perception of quality, guideline clarity, information, and functionality of features of the e-learning system [17].
Assurance	ASS	The variable represents the assurance of information during the learning processes involving good people, processes, and systems that will affect e-learning service quality [14].
Empathy	EMP	The variable shows commitment to share information about various instructional materials. It shows good e-learning utilization that will affect e-learning service quality [18].
Responsiveness	RES	This variable represents a quick response from good people and a system that will affect e-learning service quality [11].
Reliability	REL	The variable indicates the reliability of people and the system involved in a good lecturing process that will affect e-learning service quality [11].
Website Content	WSC	Content of a good website that will affect e-learning service quality [19].

Table 2. List of Questions in Questionnaire

Variables	Statement
Behavioral Intention	1) I would recommend this e-learning system to someone else
	2) I would likely enroll in other online courses that are available
e-Learning Quality	1) Your perception of the overall quality of the instruction you get from the e-learning system is excellent
	2) The e-learning system seems to be up to date
	3) The e-learning system works well
	4) The e-learning system has explicit instruction
Assurance	1) The instructor is knowledgeable in his/her field
	2) The instructor is fair and impartial in grading
	3) The instructor answers all the questions thoroughly
	4) I am confident the instructor has an expert understanding of the material
	5) Our e-learning system enables a comfortable storing and sharing of documents with my colleagues
	6) Our e-learning system supports an effective and efficient sharing of information with my colleagues
	7) Our e-learning system enables easy and comfortable communication with my colleagues
	8) The e-learning offers a variety of ways to assess my learning (quizzes, written work, oral presentation, etc.)
Empathy	1) The instructor is genuinely concerned about the students
	2) The instructor understands the individual needs of students
	3) The instructor has the student's best long-term interests in mind
	4) The instructor encourages and motivates students to do their best
Responsiveness	1) The instructor quickly and efficiently responds to student needs
	2) The instructor is willing to go out of his or her way to help students
	3) The service delivered through the e-learning pages is quick
	4) The instructor always welcomes student questions and comments
Reliability	1) The instructor consistently provides good lectures
	2) The instructor is dependable
	3) The instructor reliably corrects information when needed
	4) The e-learning system provides services as promised
	5) The e-learning system is easy to navigate
	6) The e-learning system provides useful and reliable information
	7) The e-learning system makes it easy to find what I need
Website Content	1) The e-learning system uses audio elements properly
	2) The e-learning system uses video elements properly
	3) The e-learning system uses animations/ graphics properly
	4) The e-learning system uses multimedia features properly
	5) The e-learning system provides useful information
	6) The e-learning system provides accurate information
	7) The e-learning system provides high-quality information
	8) The information on the e-learning system is relevant to me
	9) There is a reliable search system on the e-learning system
	10) The e-learning system is well structured

This research adopted a quantitative method. The data were collected by distributing questionnaires to students of undergraduate degree programs using ShareITS. The measurement range was Likert scale 1 through 4; by deleting scale three, known as a neutral scale or neutral response, might lead to a central tendency effect, specifically to those in doubt with their response, and such deletion is supposed to prevent unreliable results of questionnaire data processing. Table 2 depicts the question statements used in the research model.

Then, the descriptive analysis was conducted by analyzing quantitative data collected from respondents that had completed the research questionnaires. The questionnaires were distributed both online and offline. The questionnaires were tested twice for validity and reliability. The first testing adopted 120 sample respondents, 80 of them completed the questionnaires online, and the rest 40 sample respondents did offline. The second testing adopted 100 sample respondents, 60 of them completed the questionnaires online, and the rest 40 sample respondents did offline. At first, there were 50 items of questions. After the questionnaires were tested twice, both online and offline, it was found that there 40 questions reliable to be addressed to the primary respondents.

After the questionnaires had been identified to be valid and reliable, the questionnaires were re-distributed. The research collected 502 ITS students of undergraduate programs enrolled in 10 faculties and actively attending the first semester to the eight-semester.

Implementation Phase

Having distributed the questionnaires, the researchers found attractive matters addressed by respondents utilizing the ShareITS e-learning system. It was found during the implementation phase that the online subjects lectured through ShareITS were not open to the public or voluntary as required in MOOC, except some subjects incorporated managed by the Ministry in charge of education in Indonesia after subject to feasibility testing [20]. Therefore, the number of MOOC subjects in the ShareITS platform is practically not many. 95% of the students utilized ShareITS due to encouragement by their lecturers and the rest 5% followed such online lecturing based on personal initiative.

In general, 82% of the respondents stated that they followed online lecturing on 1-2 subjects. On average, each of the respondents took 6-7 subjects, and only two subjects were lectured online through the ShareITS platform, and only 15% attended six subjects online. The degree of ShareITS utilization was only 21%. 73% of the respondents confirmed that the e-learning service quality was perceived well. The research would explore the factors perceived to be well using the conceptual model to assess what factors affected the expected e-learning service quality.

Then, the research model was tested to prove which hypotheses were accepted based on the conceptual research model. Several tests were performed, including reliability

and validity testing, classical assumption testing, and inferential analysis.

The reliability and validity testing was adopted using the SPSS Software to ensure that the collected data in the research were reliable and valid. The testing results showed that all of the statement items were reliable and valid. Having completed the reliability and validity testing, the researcher conducted a classical assumption testing.

The classical assumption testing was adopted to assure that the multiple linear regression in the research was sound. The tested aspects were normality, multicollinearity, and heteroscedasticity. After that, an inferential analysis was performed.

The research performed several tests, i.e., convergent validity, Average Variance Extracted (AVE), discriminant validity, and composite validity. The results of AVE testing was good as the value of each tested variable was > 0.5 . The discriminant validity was good as all variables to variable constructs had better value than the ones of other variables—the composite Cronchbach Alpha ≥ 0.60 . In short, it was conclusive that the variables in the research were reliable and valid to represent the original data.

Having completed the outer model testing, the researcher proceeded to the goodness fit index testing. It represented how good was the model for the research. The research adopted the Standardized Root Mean Square Residual (SRMR) method. The goodness fit index value assessed employing the SRMR method in the research showed that the value of the estimation model was 0.087 (acceptable). Having identified the result of goodness fit index testing, the researcher proceeded with the inner model testing. The result of the inner model testing showed that not all variables had a positive regression coefficient, and the significance value was 1.647.

3. Result and Discussion

There are three main stages in this research, analysis, and testing. They are descriptive analytics, reliability, and validity test, classical assumption test, and inferential analysis.

Descriptive analytics is used to represent the results of data processing descriptively to know the patterns and demographics of research respondents. After conducting descriptive analytics, the data then being tested its reliability and validity.

Reliability and validity tests are used to ensure that the data used in the research is reliable and valid. This test uses SPSS software, and the results obtained are all items reliable and valid statement. After conducting reliability and validity testing, the classical assumption test then being tested.

The classical assumption test is used to assure that multiple linear regression in the research is sound. There are three parts of the classical assumption test, which are the normality test, multicollinearity test, and heteroscedasticity test. This test uses Minitab software, and

the results obtained are all data test results that fulfill the multicollinearity test and heteroscedasticity test, while for the normality test results, there is one variable that is not normally distributed. However, some researchers suggest that allow if it does not fulfill one test in the classical assumption test. After conducting the classical assumption test, the inferential analytics then being tested. Inferential analytics in this research using SmartPLS software. Inferential analytics has two tests, i.e., the outer model and the inner model [21].

a. Outer Model Test

The outer model test is used to measure the reliability and validity of statement items in each variable. The result of convergent validity is found valid because all statement items have value above 0.5 (see Table 3). The results AVE (Average Variance Extracted) is found acceptable because all variables have values above 0.5. The results of discriminant validity are declared good because all the variables to the construct of the intended variable have a greater value than the value of other variable constructs. The result of composite reliability is reliable because it has a composite reliability value $\geq 0,70$ and Cronchbach Alpha value $\geq 0,60$. So it can be concluded that the variables in this research can represent the original data.

Table 3. Outer Model Result

Item	Loading factor	Convergent Validity
ASS	<i>AVE = 0,559 ; Alpha = 0,736; CR = 0,835</i>	
ASS5		0.708
ASS6		0.840
ASS7		0.731
ASS8		0.705
EMP	<i>AVE = 0,618; Alpha = 0,796; CR = 0,866</i>	
EMP1		0.765
EMP2		0.780
EMP3		0.821
EMP4		0.778
RES	<i>AVE = 0,507; Alpha = 0,686; CR = 0,804</i>	
RES1		0.742
RES2		0.767
RES3		0.618
RES4		0.712
REL	<i>AVE = 0,548; Alpha = 0,720; CR = 0,827</i>	
REL2		0.603
REL4		0.715

Item	Loading factor	Convergent Validity
ASS	<i>AVE = 0,559 ; Alpha = 0,736; CR = 0,835</i>	
REL6		0.835
REL7		0.787
WSC	<i>AVE = 0,543; Alpha = 0,707; CR =0,823</i>	
WSC1		0.759
WSC6		0.791
WSC7		0.826
WSC8		0.655
ELQ	<i>AVE = 0,610; Alpha = 0,788; CR = 0,862</i>	
ELQ1		0.754
ELQ2		0.758
ELQ3		0.812
ELQ4		0.800
BEH	<i>AVE = 1,000; Alpha = 1,000; CR =1,000</i>	
NBEH3		1.000

b. Goodness Fit Test

After doing the outer model test, the goodness-fit index was applied to measure how well the model in this research. A good model is shown by the value estimation model of the selected model measurement method—this research, using the SRMR measurement method (Standardized Root Mean Square Residual). The value of goodness fit index performed by the SRMR method in this research yielded an estimation model value of 0.087 (See Table 4). So it can be concluded that the model in this research is acceptable.

Table 4. Goodness Fit Test Result

Goodness of fit	Cut off value	Result
Standardized Root Mean Square Residual (SRMR)	$0,05 \leq \text{SRMR} \leq 0,10$	$0,087$
	acceptable fit	
	$0 \leq \text{SRMR} \leq 0,05$	good fit

c. Inner Model Test

The inner model test then being tested. The result of the inner model test showed that is not all variable relations have a positive regression coefficient value and significance value greater than 1.647. Of the six hypotheses, there are only two hypotheses that have a positive regression coefficient value and a significance value greater than 1.647, which means having a positive and significant relationship.

Table 5 shows that the correlation of variables that have a positive and significant effect are: (1) Responsiveness to e-learning quality, and (2) Website Content to e-learning quality.

Table 5. Inner Model Test Result

Variable Correlation	Coefficient Parameters	T-Table	T-Statistics	P-value
ASS → ELQ	0.031	1.964	0.641	0.522
EMP → ELQ	0.084	1.964	1.640	0.102
RES → ELQ	0.329	1.964	7.191	0.000
REL → ELQ	-0.003	1.964	0.064	0.949
WSC → ELQ	0.343	1.964	7.137	0.000
ELQ → BEH	-0.159	1.964	2.819	0.005

Table 6 shows the results of R-square.

- The variable of behavioral intention has an R-Square value of 0.025. The result shows that behavioral intention variables can be explained by the variability of assurance, empathy, responsiveness, reliability, website content, and e-learning quality of 2.5%.
- The variable of e-learning quality has an R-Square value of 0.411. The result shows that the variable of e-learning quality can be explained by the variability of assurance, empathy, responsiveness, reliability, and website content 41.1%.

Table 6. R-square Test Result

<i>R-square Of Latent Variable</i>	
BEH	0.025
ELQ	0.411

Then, the hypothesis testing will be applied to know the acceptance or rejection of the hypotheses prepared by the researcher based on the conceptual model of research through the bootstrapping process on the structural model using SmartPLS software.

Table 7. Hypotheses Results

Hypotheses	Result
<i>Assurance -> E-Learning Quality</i>	Rejected
<i>Empathy -> E-Learning Quality</i>	Rejected
<i>Responsiveness -> E-Learning Quality</i>	Accepted
<i>Reliability -> E-Learning Quality</i>	Rejected
<i>Website Content -> E-Learning Quality</i>	Accepted
<i>E-Learning Quality -> Behavioural Intention</i>	Rejected

Table 7 depicts two accepted hypotheses, which are the relationship responsiveness variable and e-learning quality, and the relationship website content variable and e-learning quality.

d. Effects of Variable Responsiveness to E-Learning Quality Variable

Based on the result of the inferential analysis presented in the previous implementation paragraph, it was found that the responsiveness variable positively and significantly affected the e-learning quality variable. It is evidenced by the value of a parameter coefficient of 0.329 and the value of T-stat that was greater than the one of T-Table

of 7,191 gained from inferential analysis to explain that the responsiveness variable has a significant relationship with the e-learning quality variable.

The value of the parameter coefficient was used to explain that the responsiveness variable has a positive effect on the e-learning quality variable. Accordingly, it was found that the relationship between the responsiveness variable and the e-learning quality variable was positive and significant. Based on such conclusion, correction and improvement in issues related to responsiveness would directly affect e-learning quality through ShareITS and a basis of recommendations in the preparation of MOOC implementation.

The following are four recommendations to improve responsiveness:

1. To provide a service to register a username and password. The recommendation is based on responses to open questions, i.e., the students were given the e-learning username and password of Share-ITS from the administrator in a pretty long time.
2. To expand bandwidth services and to perform regular server maintenance to facilitate better speed of access to the system. The recommendation arises based on responses to open questions, i.e., access to system loading is slow. It indeed calls for a better wifi connection to ITS and server maintenance to prevent 'down' condition when being accessed.
3. To have the enrollment process integrated with Integra. The recommendation is based on responses to open questions, i.e., an easy process in registering enrollment of a course.
4. To arrange a workshop on how to give responses to questions and comments in a forum in ShareITS. The recommendation emerges based on responses to open questions, i.e., Not all users receive questions and give comments.

e. Effect of Website Content Variable to E-Learning Quality Variable

Based on the results of the inferential analysis, it was found that the website content variable positively and significantly affected the e-learning quality variable. It was proved by the value of the parameter coefficient of 0.343 and the value of T-Stat that was greater than the one of T-Table of 7,137. The value of the parameter coefficient explained that the website content variable had a positive and significant effect on the e-learning quality variable. Therefore, if the website content were improved, it would directly affect the e-learning quality variable to be adopted to improve the service quality of ShareITS for ITS students. The acceptance of the hypothesis showed that there was a relationship between the website content of ShareITS and the e-learning quality variable that would be a basis for a recommendation in the preparation of MOOC implementation.

The following are four recommendations to improve website content variable:

1. To apply an embedded system for teleconference service as a substitute for classical face-to-face lecturing sessions. This recommendation is consistent with the expectation of the ShareITS administrator to implement MOOCs.
2. To offer an online certification service for non-ITS students who have completed online courses. This recommendation is consistent with the expectation of the ShareITS administrator to implement MOOCs.
3. To have the UI and UX clear course grouping. This recommendation is consistent with the expectation of e-learning service users based on the responses to open questions.
4. To present detailed information about the availability and number of courses that have been, are being, and will be offered. This recommendation is consistent with the expectation of e-learning service users based on the responses to open questions MOOC checklist rules provided by EdX.

4. Conclusion

Based on the results of research on implementing the e-learning quality (eLQ) model to identify the factors affecting ShareITS service quality, we conclude that factors of responsiveness and website content affected e-learning service quality. The administrator of ShareITS must consider those aspects to enhance the e-learning service quality. The results found that those two aspects focused on online learning supporting technology to assure responsiveness and appropriate content as expected by the users of ShareITS, instead of on human or organization as commonly experienced by other academic institutions.

The observation using the e-learning quality (eLQ) model showed that e-learning service quality had no relationship with behavioral intention to use it. The number of respondents in this research was quite sufficient, i.e., 502 respondents, to support the finding that e-learning service quality was not a determinant of behavioral intention within the e-learning quality model. It is consistent with the mandatory use theory and the existing condition of the ShareITS. However, the e-learning service quality may not perceive good when observed from the perspective of service quality only. It also needs to be viewed in terms of the degree of its utility. We suggest, therefore, to further explore the human behavior-related aspect using other models or to modify the conceptual research model to generate more complete results.

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