ANALYSIS OF THE INFLUENCE OF E-LEARNING SERVICE QUALITY FACTORS ON STUDENT PERCEIVED VALUE AND STUDENT SATISFACTION, WITH IMPLICATION TO STUDENT LOYALTY

ANALIZA WPŁYWU CZYNNIKÓW JAKOŚCI USŁUG E-LEARNINGU NA POSTRZEGANIE WARTOŚCI, SATYSFAKCJĘ I LOJALNOŚĆ STUDENTÓW

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ABSTRACT

The COVID-19 pandemic has changed the learning process, which was previously carried out conventionally with face-to-face interaction, into an online learning activity (e-learning). e-Learning has several benefits, but it also has some challenges that need to be addressed. A preliminary survey has been conducted by asking open-ended questions regarding students' experience and obstacles during e-learning to determine their perceptions of e-learning, and the results showed that there were problems faced by students in implementing e-learning, especially pertaining to student loyalty. Previous research has stated that e-learning service quality exercises an influence on student satisfaction and student loyalty. This research focusses on the influence of e-learning service quality factors on student perceived value (SPV) and student satisfaction, and ultimately on its role in influencing student loyalty. This research was conducted using a quantitative approach, wherein data were gathered, using judgement sampling, from 309 undergraduate students enrolled across six universities in Tangerang. These data were analysed by partial least squares structural equation modelling (SEM-PLS), and the results of the analysis indicated the presence of a positive and significant relationship between these variables. Resultant to the analysis, there emerged some useful suggestions for educational institutions and lecturers that would enable them to improve the quality of e-learning. The findings of the present study imply that improving the factors of e-learning service quality will inculcate in students a favourable value perception towards the university, as well as create a feeling of satisfaction in them, arising from the fulfilling character of the experience to which they were exposed during the e-learning process; these phenomena are expected in turn to increase students' loyalty towards the university.

 Key words: e-learning, service quality, perceived value, satisfaction, loyalty

ABSTRAKT

Pandemia COVID-19 wpłynęła procesy uczenia się, nuczanie metodą tradycyjną „twarzą w twarz" zmieniło się na nauczanie online (e-learning). e-Learning ma kilka zalet, ale wiąże się również z pewnymi wyzwaniami, którym należy sprostać. Przeprowadzono wstępną ankietę, zadając otwarte pytania dotyczące doświadczeń uczniów i przeszkód na jakie natrafiają podczas e-learningu, aby określić ich postrzeganie tej metody nauczania. Wyniki pokazały, że studenci mieli problemy z wdrażaniem e-learningu, zwłaszcza w kwestii ich lojalności. Wcześniejsze badania wykazały, że jakość usług e-learningowych ma wpływ na satysfakcję i lojalność studentów. Niniejsze badania koncentrują się na wpływie czynników jakości usług e-learningowych na postrzeganą wartość (SPV) i satysfakcję studentów, a ostatecznie na ich rolę w kształtowaniu ich lojalności. Badanie to zostało przeprowadzone przy użyciu podejścia ilościowego, w ramach którego zebrano dane, stosując dobór oceny 309 studentów studiów licencjackich sześciu uniwersytetów w Tangerang. Dane te przeanalizowano za pomocą modelowania równań strukturalnych metodą cząstkowych najmniejszych kwadratów (SEM-PLS), a wyniki analizy wykazały obecność pozytywnej i istotnej zależności między tymi zmiennymi. W wyniku analizy wyłoniło się kilka przydatnych sugestii dla instytucji edukacyjnych i wykładowców, które umożliwiłyby im poprawę jakości e-learningu. Wyniki niniejszego badania sugerują, że poprawa czynników jakości usług e-learningowych zaszczepi w studentach pozytywne postrzeganie wartości wobec uczelni, a także stworzy w nich poczucie satysfakcji, wynikające z charakteru doświadczenia, do którego zostały ujawnione podczas procesu e-learningowego; Zjawiska te mają z kolei zwiększyć lojalność studentów wobec uczelni.

Słowa kluczowe: e-learning, jakość usługi, postrzegana wartość, satysfakcja, lojalność

Introduction

The occurrence of the COVID-19 pandemic in Indonesia prompted the government to enforce physical distancing to reduce the spread of the COVID-19 virus. The implementation of physical distancing has had an impact on several facets of human activity, encompassing the commercial and the non-commercial; for instance, the economy has been affected due to the cessation of several economic activities, and the mandatory social distancing protocols have had the effect of reducing opportunities for face-

to-face social interactions (Ilyas, 2021; Mawar et al., 2021). One among these inevitable impacts was that teaching and learning activities could not be carried out by means of face-to-face interaction. The current pandemic condition demands a change in the learning culture, which was previously done conventionally with face-to-face interaction, to a learning activity carried out online (e-learning). e-Learning has been deemed the only way to continue the learning process in Indonesia when experiencing natural disasters or pandemics (Syarifudin, 2020). e-Learning is expected to encourage a more rigorous implementation of social distancing as well as serve as one of the efforts aimed at reducing the spread of the COVID-19 virus (Sadikin & Hamidah, 2020).

The development of information and communication technology (ICT) triggers the development of the online teaching and learning process. The media used in e-learning activities can be in the form of a learning management system (LMS) prepared by educational institutions as online learning media, as well as the use of other media; and the most common media platforms used in Indonesia for e-learning are WhatsApp, Zoom, Google Classroom, Google Meet and email (Pramana et al., 2020). Good preparation is needed in formulating the e-learning process so that the objectives of learning can be achieved and so that the students who pass through the education system under the aegis of the e-learning process become and remain competent in their respective fields of specialisation at the graduation and higher levels, and, at lower levels, achieve the fundamental objectives of the course undergone by them. The quality of e-learning implemented during the COVID-19 pandemic is influenced by several factors, namely administrative support, course content, course design, instructor characteristics, learner characteristics, social support and technical support factors (Elumalai et al., 2019). The quality of e-learning administrative and support services, instructor performance and learning course materials have the greatest influence on the overall e-learning service quality (Pham et al., 2018). The e-learning process incorporates several benefits, which can provide flexibility in the learning process and encourage the emergence of independence in learning (Sadikin & Hamidah, 2020). Online learning can help students to obtain learning materials easily and discuss it with experts and lecturers without being limited by constraints of place and time (Hartanto, 2016).

e-Learning also presents several challenges that need to be faced, such as an inadequate internet connection and the lack of a conducive home environment in which the learning process might be carried out, as well as the emergence of a sense of isolation and a decrease in motivation levels due to a lack of face-to-face interaction (Rizvi & Nabi, 2021). Another challenge faced in the e-learning process is the lack of preparation, which encompasses two possible dimensions: an inadequacy in the infrastructural amenities that an educational institution makes available (to students undergoing education through the e-learning mode, as well as to the concerned teaching staff), and a paucity in the preparation of students. Against the backdrop of the fact that the prevalence of conditions such as pandemics and other unusual situations would trigger the adoption of the forced use of e-learning, such lack of preparation would result in the emergence of feelings of being under pressure whilst undergoing the e-learning programme (Abdur Rehman et al., 2021). The other measurable, significant impact caused by the e-learning process is that in terms of student loyalty towards the institution in which they are enrolled. In the absence of a timely resolution being provided, the challenges that students face can create frustration in them, as well as reduce their motivation for learning. Students' loss of motivation and decrease in their learning performance can also be caused by a lack of support in terms of infrastructure or a lack of social support from lecturers in the e-learning process (Tan, 2021). The challenges that occur in the e-learning process have the potential to exercise a negative impact on students.

A preliminary survey has been conducted on 46 students in Tangerang to observe the phenomenon of the e-learning process being carried out. The survey was conducted by asking six open-ended questions regarding students' experiences, impressions and obstacles while undergoing e-learning. From the survey conducted, it was found that students experienced both benefits and challenges during e-learning. The benefits are that students can flexibly choose their own time and place in preparing for classes, there are savings in transportation costs and living costs, the digital technology deployed in the e-learning process allows customisation to suit end-user needs, e.g. voice volumes can be adjusted

by each participant, and there is a greater accessibility of materials. Universities that have implemented effective e-learning systems have thereby ensured the ease of participants' learning. One of the main factors that respondents recommend to their universities is the readiness of the e-learning system.

On the other hand, students also experience many challenges and difficulties during e-learning. The common obstacles experienced by these students are problems pertaining to poor internet connection and infrastructural deficits, concentration that is easily divided and disturbed by other things, resulting in the level of interaction and communication getting disrupted, decrease in the level of motivation to study and pay attention to what is going on in the class, boredom, and fatigue in the eyes and body due to staring at the screen for too long; cumulatively, these problems can adversely affect students' interest in learning. The challenges experienced during the e-learning process also affect the level of interest of students in being active in activities at their university; the survey results reveal that 57% of respondents stated that their level of interest in participating in activities decreased compared to that prevailing prior to commencement of the e-learning process. An inability to carry out direct interaction has been observed to be one of the factors influencing respondents' absence of interest in participating in university activities. Furthermore, the level of interest in continuing further studies at the university is also affected. The results of the survey reveal that 61% of respondents stated that there was a decline or doubt in the level of interest in continuing their further studies at their university. This is because students have been experiencing boredom with regard to the e-learning process that they had been undergoing for the duration of the COVID-19 pandemic physical distancing restrictions.

This phenomenon has motivated the present research, which focusses on the influence of e-learning service quality factors on student perceived value (SPV) and student satisfaction, and finally on student loyalty. It is important to pay attention to this phenomenon, because if it is ignored, it can have a major impact on the quality of human resources in the future.

Literature Review

e-Learning

The online distance learning process, also known as e-learning, is a process involving learning and teaching activities that are carried out virtually by utilising internet facilities. In the e-learning process, the delivery of learning materials and evaluation of abilities, as well as interactions between lecturers and students, are carried out using ICT (Muhammad et al., 2016). The development of internet technology has facilitated, within the education system, the transition from traditional to modern teaching methods (Elumalai et al., 2019). The deployment of technology in education has provided an opportunity for lecturers and students to utilise the teaching and learning processes, from their respective points of view, in ways that would enable them to reach their full potential. There are several types of e-learning, including: Blended Learning, which is a combination of traditional and online classes, Flipped Classroom, which is a student-centred approach with online learning materials that have been given to students before class, Synchronous Learning, which is a distance learning process with real-time interaction, and Asynchronous Learning, which is a distance learning process with non-real-time interaction (Alqahtani & Rajkhan, 2020).

Relationship between system quality (SYQ) and e-learning service quality (SEQ)

System quality is a measurement of the information system process that focusses on the results of the interaction between the user and the system. The quality of the system can be measured by considering the ease of use (Aditi et al., 2021). System quality determines the characteristics of a system based on several aspects, namely usability, reliability, availability and adaptability, that affect user perceptions of using e-learning systems, and plays an important role in the adoption and use of e-learning systems (Salloum et al., 2019). Previous research has shown that the e-learning system quality is the most important factor influencing the e-learning services quality (Pham et al., 2019). The quality of the system has a crucial

role in the use of e-learning systems (Alsabawy et al., 2012; Salloum et al., 2019). Therefore, this study proposes the following hypothesis:

Hypothesis 1: System Quality has a positive and significant influence on e-Learning Service Quality.

Relationship between instructor and course material quality (ICQ) and e-learning service quality (SEQ)

Instructor and Course Material Quality (ICQ) is defined as the quality of the instructor's role in conveying their knowledge to students and the material used in each learning process (Pham et al., 2018). The characteristics that the instructor would ideally need to focus on include attitude, flexibility, knowledge of learning technology, teaching styles and the ability to motivate students (Alqahtani & Rajkhan, 2020). The learning course material focusses on learning development systems to achieve the goals of educational institutions, which consist of quality content, clarity of objectives, and learning strategies (Alqahtani & Rajkhan, 2020). The quality of an instructor and learning course materials are the factors affecting the quality of e-learning services (Pham et al., 2019). Course content and characteristics of instructors, conjoined as an amalgamated parameter, served as one of the factors that affected the quality of the e-learning that was implemented during the COVID-19 pandemic (Elumalai et al., 2019). The role of instructors is crucial in improving the quality of e-learning to a standard that would enable students to learn effectively during the COVID-19 pandemic (Abbasi et al., 2020). Therefore, this study proposes the following hypothesis:

Hypothesis 2: Instructor and Course Material Quality has a positive and significant influence on e-Learning Service Quality.

Relationship between administrative and support service quality (ASQ) and e-learning service quality (SEQ)

The administrative support factor focusses on supporting infrastructure and learners to enhance their experience. This includes

communication assistance, as well as the availability to become a help centre and a training centre (Alqahtani & Rajkhan, 2020). The quality of e-learning support and administration, which exercises an important influence on the degree of attention that students pay to their lessons when undergoing a programme of e-learning, is in turn directly influenced by the level of service provided by university staff, including technical support pertaining to technological issues that may pose a hindrance to the uninterrupted functioning of e-learning sessions (Pham et al., 2018). The quality of support services is assessed through the assistance provided; the assessment is based especially on the support received in relation to online learning. The administrative and support services quality is one of the factors that affect the e-learning services quality (Pham et al., 2019). Administrative support has been one of the factors affecting the quality of the e-learning that was implemented during the COVID-19 pandemic (Elumalai et al., 2019). In determining the quality of e-learning services, what is important is not merely the teaching aspect but also the aspect of administrative services and other services (Arguelles & Busquet, 2016). Therefore, this study proposes the following hypothesis:

Hypothesis 3: Administrative and Support Service Quality has a positive and significant influence on e-Learning Service Quality.

Relationship between e-learning service quality (SEQ) and SPV

The quality of service received by customers is believed to have an influence on the value perceived by customers. Service quality has an impact on the customer's perception of value; if the quality of the service received exceeds the customer's expectations, such a phenomenon would effect an increase in the value perceived from the customer's vantage point (in a generic context referred to as 'perceived value') (Hapsari et al., 2017). There is a positive and significant relationship between e-service quality and the perceived value of customers who use technology in Indonesia (Aditi et al., 2021). The relationship between e-service quality and perceived value shows that students, as users of

online systems, evaluate the degree of worth that they associate with the university based on an assessment of the benefits and disadvantages characterising the system used by them in their interactions with university staff (Kilburn et al., 2016). Therefore, this study proposes the following hypothesis:

Hypothesis 4: e-Learning Service Quality has a positive and significant influence on Student Perceived Value.

Relationship between e-learning service quality (SEQ) and student satisfaction (STS)

The level of customer satisfaction is believed to increase along with the increase in the quality of online-based services (Fida et al., 2020). The satisfaction of students, who are customers in the learning environment, is also influenced by the quality of the e-learning services they receive. The quality of e-learning services provided by universities is believed to have a positive influence on student satisfaction (Annamdevula & Bellamkonda, 2016; Arguelles & Busquet, 2016; Chandra et al., 2018; Doan, 2021; Lunarindiah, 2016; Pham et al., 2019). Therefore, this study proposes the following hypothesis:

Hypothesis 5: e-Learning Service Quality has a positive and significant influence on Student Satisfaction.

Relationship between SPV and student satisfaction (STS)

Perceived value or the customer's overall assessment of what is received compared to what is given is believed to have a strong influence on customer satisfaction. Several studies mention that the perceived value of customers has a strong influence on the level of satisfaction (Hapsari et al., 2017; Kusumawati & Rahayu, 2020). There is a positive and significant relationship between perceived value and e-satisfaction from customers who use technology in Indonesia (Aditi et al., 2021). The level of SPV also has a positive and significant influence on the level of student satisfaction

with regard to the university (Halimatussakdiah et al., 2020; Lunarindiah, 2016). Therefore, this study proposes the following hypothesis:

Hypothesis 6: Student Perceived Value has a positive and significant influence on Student Satisfaction.

Relationship between SPV and student loyalty (STL)

It has been assessed that the perceived value of a customer is a factor that has a significant impact on customer loyalty (Kusumawati & Rahayu, 2020). Perceived value is believed to have a major influence on customer loyalty (Lai et al., 2009). SPV is believed to exercise a positive influence on the concerned student's degree of loyalty towards their chosen institution of collegiate education (Kilburn et al., 2016), and additionally to influence the intention to continue e-learning activities (Nugroho et al., 2019). Therefore, this study proposes the following hypothesis:

Hypothesis 7: Student Perceived Value has a positive and significant influence on Student Loyalty.

Relationship between student satisfaction (STS) and student loyalty (STL)

The satisfaction received by customers is believed to result in loyal customers, and moreover, when a feeling of satisfaction arises in a customer resultant to experiencing a product or service, this phenomenon associates that particular commodity with an impression of positivity within the customer's memory (Kusumawati & Rahayu, 2020; Sharma et al., 2020). Previous research stated that a 1% shift in customer satisfaction can result in a 61.7% shift in customer loyalty (Ibojo & Asabi, 2015). Several studies have shown that the level of student satisfaction affects the level of student loyalty (Annamdevula & Bellamkonda, 2016; Arguelles & Busquet, 2016; Chandra et al., 2018; Doan, 2021; Pham et al., 2019). The dissatisfaction of an information system (e-learning) user can cause the user's unwillingness to continue

using the system (Nugroho et al., 2019). Therefore, this study proposes the following hypothesis:

Hypothesis 8: Student Satisfaction has a positive and significant influence on Student Loyalty.

Mediating effects

The quality of service received by the customer/student can affect the perceived value and ultimately can affect the level of satisfaction. Previous research stated that there is a positive and significant relationship between e-service quality and e-satisfaction with the mediation of SPV from customers who use technology in Indonesia (Aditi et al., 2021). e-Service quality will affect the degree of fulfilment of customer's expectations, and when these are effectively fulfilled, customer satisfaction would be the result (Demir et al., 2020).

The perception of value felt by students in undergoing the e-learning process will affect the level of satisfaction; if a sense of satisfaction is resultantly produced, it will result in students' loyalty towards the university. Satisfaction has a role as a strong mediator in the relationship between perceived value and continuance intention concerning the use of e-learning (Nugroho et al., 2019). The level of satisfaction of students can mediate between SPV and the intention to use the e-learning system and recommend it to others (Chang, 2013). Therefore, this study proposes the following hypotheses:

Hypothesis 9: e-Learning Service Quality has a positive and significant influence on Student Satisfaction mediated by Student Perceived Value.

Hypothesis 10: Student Perceived Value has a positive and significant influence on Student Loyalty mediated by Student Satisfaction.

The relationships between factors and its mediating effects shown on Figure 1.

Figure 1. Research framework
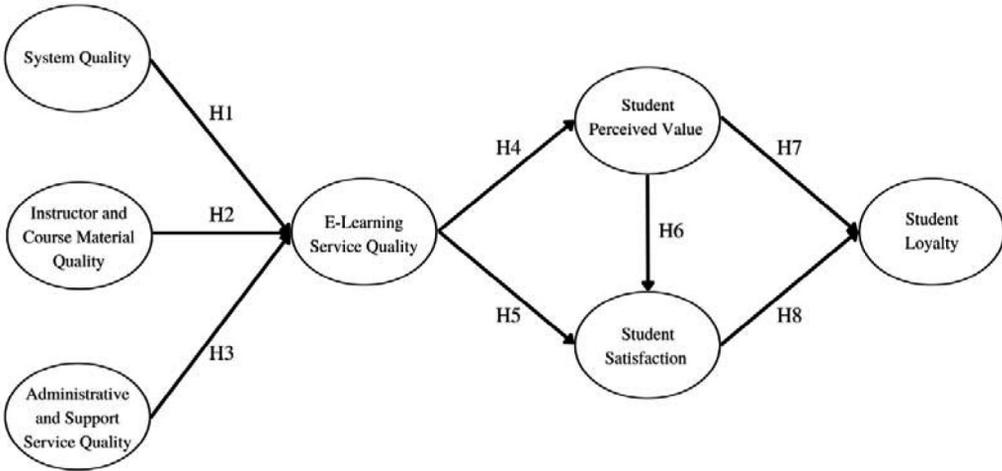
Research Methods

The present research was conducted using a quantitative research approach. Data collection was carried out by distributing questionnaires via Google Form to undergraduate students participating in e-learning at six universities in Tangerang. The selected respondents were active students who had previously experienced the offline learning process, and had thereafter participated in e-learning; these were students from batches 2017, 2018 and 2019. The questionnaires were distributed using the social media platforms WhatsApp, Line and Instagram, from April to May 2022. The questionnaires were distributed using several approaches, and in employing these approaches, the power of social media to serve as a tool for preliminary data gathering became apparent, and what also became evident was that social media could exercise a major influence in data collection. The first approach involved sending private chats to known and qualified respondents. In addition, to ensure that other respondents from various universities were also included in the study, a search and screening operation was carried out through the Instagram accounts of several university organisations, which was followed by

sending direct messages via Instagram to prospective respondents. Given the immense propagation power of social media, this series of actions can be expected to produce a networking chain that plays a major role in the process of finding respondents and collecting data.

The survey contains a total of 35 questions, where each variable has 5 questions. The survey uses a 5-point Likert scale from 1, which indicates strongly disagree, to 5, which states strongly agree. The questions contain respondents' perceptions of: (1) the quality of the e-learning website, which consists of the ease of use, visual appearance, delay time on the website and ease of finding information on the website; (2) the quality of the instructors, consisting of their knowledge and their ability to create good and interactive learning environments, as well as whether or not the materials provided are useful and up to date; (3) the quality of administrative and support services, which need to be provided in a way that is fast and relevant to the problem on hand, as well as whether or not the troubleshooting team responsible for attending to these services understands and prioritises user needs upon the experiencing of numerous, simultaneous problems; (4) e-learning service quality, which needs to consist of adequate levels of human resources and infrastructure pertaining to the provision of e-learning services; (5) students' assessment of the benefits and services obtained against the sacrifices made such as costs, effort and time; (6) satisfaction and pleasant experiences that students obtain; and (7) student loyalty, consisting of overall impressions formed by students about, and the sense of pride felt by them for, their university, as well as the recommendations made by them seeking improvements to be made to their university.

The survey was started by distributing it to 34 respondents for instrument analysis using IBM® SPSS® Statistics 25. The results of the analysis show that all indicators are valid and reliable, and thus it is continued, with the distribution of the survey to the main population to analyse the hypotheses that have been prepared.

The data collected through the questionnaire are analysed with the partial least square structural equation model (PLS-SEM) method using SmartPLS 3.0 by SmartPLS GmbH. The data are analysed in several stages; first, by analysing the outer model through convergent validity

testing; thereafter, by measuring Outer Loading and average variance extracted (AVE) through discriminant validity testing; then, by measuring Cross Loading and Fornell-Larcker criterion; and finally, by conducting reliability testing through measurement of composite reliability and Cronbach's alpha. Then, we analyse the inner model by testing the coefficient of determination (R^2), effect size (f^2) and structural path coefficients on the proposed hypothesis.

Findings and Results

A total of 309 respondent data elements have been collected from students at six universities in Tangerang. Respondents came from various faculties, and the largest was from the business faculty with a proportion of 30%, followed by the engineering faculty at 24%; and these were followed by the faculties of science, communication, computer, design and law. A total of 76% of respondents came from the 2019 batch, followed by the 2018 batch (as much as 21%), and 2% came from the 2017 batch. Female respondents dominated the characteristics of respondents with a proportion of 61%, compared with male respondents who had a proportion of 39% of all respondents.

In descriptive statistical analysis, it was found that SYQ has an average value of 4.061, with SYQ3 (My university's e-learning course website provides me with important information.) having the highest average value of 4.262. ICQ has an average value of 4.115, with ICQ5 (The material provided through e-learning is up to date.) having the highest average value of 4.243. ASQ has an average value of 3.906, with ASQ1 (The university staff provide fast service when I have problems pertaining to any of the e-learning sessions or the programme as a whole.) having the highest average value of 3.958. SEQ has an average value of 4.091, with SEQ5 (Overall, the quality of e-learning services provided by my university is good.) having the highest average value of 4.210. SPV has an average value of 3.915, with SPV4 (e-Learning facilitates my needs in terms of knowledge, learning and development.) having the highest average value of 4.104. STS has an average value of 4.073, with STS5 (I am very satisfied doing my studies at my university.) having the highest

average value of 4.233. STL has an average value of 4.070, with STL1 (My university gives me a positive impression.) having the highest average value of 4.307.

In the outer model analysis, all indicators in the research model have an Outer Loading value >0.7 and an AVE value >0.5, and thus it can be stated that the indicator has a high level of validity (Hair et al., 2013). Then, all indicators and variables have higher Cross Loading values and AVE square root values for their variables compared to correlations with other variables, and thus it can be stated that all indicators have a good level of discriminant validity (Hair et al., 2013). Then, from reliability testing, it has been ascertained that all variables have composite reliability and Cronbach's alpha values >0.6, and thus it can be stated that all variables are reliable and consistent for use as research instruments (Ghozali & Latan, 2015).

From the coefficient of determination measurement that can be seen in Table 1, it can be inferred that SYQ, ICQ and ASQ can explain e-learning SEQ by 59.9%, while the remainder is influenced by other variables. Then, SEQ can explain the SPV by 43.6%. SEQ and SPV can explain STS by 66.8%. SPV and STS can explain the STL by 56%. The research model has a moderate classification with an R^2 value of 0.5 (Hair et al., 2013).

Table 1. **Coefficient of determination (R^2) measurement**

No.	Variable	R^2
1.	e-Learning SEQ	0.599
2.	SPV	0.436
3.	STS	0.668
4.	STL	0.560

SEQ, service quality; SPV, student perceived value; STL, student loyalty; STS, student satisfaction.

In the effect size measurement test based on Table 2, an influence can be observed between variables (Hair et al., 2013). ASQ and ICQ have the greatest influence on SEQ, with f^2 values of 0.224 and 0.223, respectively. Furthermore, SEQ has a large influence on SPV, with an f^2 value of 0.774.

SPV has a greater influence on STS with an f^2 value of 0.380, in comparison with SEQ having an f^2 value of 0.305 on STS. STS has a greater influence on STL with an f^2 value of 0.371, in comparison with SPV having an f^2 value of 0.028 on STL.

Table 2. Effect size (f^2) measurement

No.	Variable	SEQ	SPV	STS	STL
1.	SYQ	0.082			
2.	ICQ	0.223			
3.	ASQ	0.224			
4.	SEQ		0.774	0.305	
5.	SPV			0.380	0.028
6.	STS				0.371

ASQ, administrative and support service quality; ICQ, Instructor and course material quality; SEQ, service quality; SPV, student perceived value; STL, student loyalty; STS, student satisfaction; SYQ, system quality.

In the path coefficients' measurement based on Table 3, all path coefficient values are positive, and thus it can be stated that exogenous variables have a positive influence on endogenous variables in each of the proposed relationships. Furthermore, all paths have a t-value >1.96 and a p-value <0.05, indicating that all the relationships between the variables that have been proposed have a statistical significance. The results of the mediation test show that the t-value is >1.96 and the p-value is <0.05, indicating that all the relationships between the variables that have been proposed through the mediating variable have a statistical significance. The direct and indirect relationships between the variables that have been proposed have a statistically significant effect as their results, and thus it can be stated that the mediation model that occurs in these relationships is partial mediation and shows that exogenous variables are able to directly influence endogenous variables through or without mediating variables. The results of the summarised hypothesis analysis can be seen in Table 4.

Table 3. **Path coefficient measurement**

	Path coefficient value	t-value>1.96	p-value<0.05
SYQ $\Rightarrow$ SEQ	0.215	4.639	0.000
ICQ $\Rightarrow$ SEQ	0.364	6.879	0.000
ASQ $\Rightarrow$ SEQ	0.368	7.216	0.000
SEQ $\Rightarrow$ SPV	0.661	17.673	0.000
SEQ $\Rightarrow$ STS	0.424	8.607	0.000
SPV $\Rightarrow$ STS	0.473	10.112	0.000
SPV $\Rightarrow$ STL	0.168	3.101	0.002
STS $\Rightarrow$ STL	0.613	10.962	0.000
SEQ $\Rightarrow$ SPV $\Rightarrow$ STS	0.312	8.580	0.000
SPV $\Rightarrow$ STS $\Rightarrow$ STL	0.290	8.133	0.000

ASQ, administrative and support service quality; ICQ, Instructor and course material quality; SEQ, service quality; SPV, student perceived value; STL, student loyalty; STS, student satisfaction; SYQ, system quality.

Table 4. **Hypothesis result**

	Hypothesis	Results
H1	SYQ has a positive and significant influence on SEQ.	Accepted
H2	ICQ has a positive and significant influence on SEQ.	Accepted
H3	ASQ has a positive and significant influence on SEQ.	Accepted
H4	SEQ has a positive and significant influence on SPV.	Accepted
H5	SEQ has a positive and significant influence on STS.	Accepted
H6	SPV has a positive and significant influence on STS.	Accepted
H7	SPV has a positive and significant influence on STL.	Accepted
H8	STS has a positive and significant influence on STL.	Accepted
H9	SEQ has a positive and significant influence on STS mediated by SPV.	Accepted
H10	SPV has a positive and significant influence on STL mediated by STS.	Accepted

ASQ, administrative and support service quality; ICQ, Instructor and course material quality; SEQ, service quality; SPV, student perceived value; STL, student loyalty; STS, student satisfaction; SYQ, system quality.

Discussion

The COVID-19 pandemic has resulted in a situation wherein universities are required to obligatorily adopt and ensure the availability of e-learning methodologies for their students; given the backdrop of this development, they thus also need, generally speaking, to enhance their awareness levels concerning the application of a framework for monitoring the quality of the coursework available on their e-learning course websites, and carrying out improvements as and when needed. This is done because the e-learning course website is a major part of the online learning process, owing to the fact that every interaction will be carried out through the e-learning course website. Several universities have improved the quality of their e-learning system by improving the functionality as well as the appearance of their website to make it easier to use, as well as by adding servers to share the traffic load emerging from the e-learning course website, so that the processes carried out on the website can run faster and better. The university needs to ensure that their e-learning course website always provides important and useful information for students to support their learning process. Furthermore, when the functionality and appearance of the e-learning course website are designed in such a way that it is not complicated and is easy to use, this will help students to use it effectively, without scope for any confusion to arise in the process. This can be done by continuously improving the system in a way that ensures the perennial satisfaction of the needs of students' learning process. The university can also facilitate this by designing the functionality and appearance of the e-learning website in such a way that it directly displays important information for students on the homepage, such as information about schedules, task lists/deadlines, forums, and links for synchronous sessions. The improvement in the quality of the e-learning system is also directly proportional to the increase in the positivity characterising the overall student assessment of the services provided by the university in effectively and efficiently facilitating the use of e-learning. Any effort on the part of the university aimed at undertaking an improvement in the online services provided is perceived by students as an advantage conferring them with access to greater-quality online resources, in

recognition of the fact that with such improvements being carried out regularly, it becomes possible for students to make a better use of e-learning course websites. Improving the quality of e-learning systems is an important factor influencing the improvement of service quality obtained from e-learning (Pham et al., 2019).

The e-learning system that has been built will not work effectively if it is not equipped with good quality instructors and learning materials. e-Learning allows instructors to be able to innovate in developing their teaching process to produce a good and interactive learning environment, which is something new and different from offline teaching. Instructors are required to adapt to the new online learning environment, which would facilitate not only the development of their talent and skills but also the development of that particular e-learning platform as a whole. The improvement of the quality of instructors and e-learning course materials is also directly proportional to the increase in the positivity of the overall student assessment of the services provided by the university in facilitating the use of e-learning efficiently and effectively. Students recognise that a heightened quality of teaching and learning materials can produce a more interactive e-learning environment, thus improving service quality, in turn having the effect of increasing students' motivation to learn. When e-learning is used as the medium for conducting learning activities, this might create a sense of boredom in students owing to the fact of an unmediated expression of the instructor's personality, as well as face-to-face interaction with the instructor, being missing, and accordingly, to attenuate the likelihood of such an eventuality, instructors need to come up with various means and devices to keep students engaged during virtual communication; the role of the instructor is thus very important in minimising breaks in students' concentration, and employing effective strategies to this end can ultimately provide better learning outcomes. It is important for universities to pay attention to the characteristics of instructors and learning course material because they are a vital part of the e-learning process. The university can facilitate the instructors to perform better by inviting the assistance of experts from industry, whose help can also be taken to complete or improve the course material hosted online. Curriculum workshops can be conducted to review

the curriculum continuously and maintain the same up to date according to conditions in the field. The university can also improve the course material and the knowledge of the instructors by arranging for training or seminars; further, access to new journals can be provided to increase the knowledge of the instructors and ensure the availability of new references in the preparation of course material. Flexibility in the delivery of teaching and instruction will improve the quality of e-learning (Elumalai et al., 2019). Improving the quality of instructors and e-learning course materials is one of the important factors influencing the improvement of the e-learning services quality (Pham et al., 2019).

e-Learning might result in students being confronted with several new problems that are not encountered when they undergo the offline learning process. This creates a necessity for the university to be able to continuously improve administrative and support services for students undergoing e-learning. The university is required to integrate its entire spectrum of online assistance services, in such a way that students can find remedies for all problems faced by them at a single online location, without there being a need for in-person meetings. The improvement in the administrative and e-learning support service quality is also directly proportional to the increase in the positivity of the overall student assessment of the services provided by the university in facilitating the efficient and effective use of e-learning. Students recognise that the readiness and role of the university staff in assisting in the problems faced by students, especially in terms of administration and support for e-learning, will ultimately improve student service assessments. Students, who were previously required to go directly to the administrative office and service assistance to get help, finally obtain the flexibility of being served anywhere and anytime. It is important for universities to improve the quality of e-learning administration and support services, because they are an important part of e-learning implementation (Elumalai et al., 2019). The university can prepare standard procedures for assistance in problems that are generally experienced by students so that faster services are available in solving student problems. The university can always improve administrative services and e-learning support in line with technological developments

and together with recognising the potential for new problems to emerge. With this, students will obtain support that can help and facilitate the e-learning process. Improving the administrative and support service quality (ASQ) is one of the important factors influencing the improvement of the e-learning services quality (Pham et al., 2019).

The quality of e-learning services received by students is a reflection of the quality of everything that a university provides to facilitate students to undergo the e-learning process; therefore, the quality of e-learning services provided by the university has an important role to play in determining the degree of positivity of the assessment made by students of the university's services. To improve the service quality characterising the e-learning process, the university should improve human resources and infrastructure. Improved service quality assessment of e-learning is directly proportional to the perceived value formed by students towards the university. Students will compare the quality of service received with the sacrifices made by them, including costs, energy and time. Good service quality can increase the perceived value of students, if the quality of service received exceeds the expectations of students (Hapsari et al., 2017). Students, as users of e-learning systems, typically arrive at their assessment of the quality of their interaction with the online system provided by the university only after considering the benefits and also the sacrifices made (Kilburn et al., 2016). The students, as individuals who have spent money on education, hope to be able to obtain good quality learning even though it is done online. Accordingly, improving the quality of e-learning services in terms of systems, instructors and course materials, as well as administrative support, will assist in realising the needs of students in undergoing the learning process.

Another top priority for the university is that the quality of e-learning services received by students should undergo continuous improvement. The university needs to pay attention to the perception of its customers, namely its students, to be able to produce a high level of satisfaction with the university. Improved e-learning service quality is directly proportional to the increase in student satisfaction with the university. In arriving at an assessment concerning the quality of

e-learning services provided by the university, students ponder over the experience that has been felt during the learning process. With the increasing quality of e-learning services received by students, a pleasant experience would be available in undergoing the e-learning process, and this would also have an impact on the level of satisfaction felt by students (Pham et al., 2019).

The perception of value that has been built from students can affect the level of student satisfaction with the university. The increase in value perceptions formed by students is directly proportional to the increase in student satisfaction with the university. Students will compare the sacrifices that have been made, including costs, energy and time, to their experience in undergoing the learning process, and in the end, this affects their level of satisfaction. Students will be more satisfied if the benefits received are comparable to or exceed the sacrifices and expectations. This also raises students' perceptions of the seriousness of the university in preparing the e-learning process. When the perceived value of students undergoes an increase, this will ultimately lead to a sense of satisfaction from students towards their university (Halimatussakdiah et al., 2020; Lunarindiah, 2016). The university needs to pay attention to the perception of value built by students because it will affect the level of satisfaction of students, as customers of the university.

The perception of value built by students about their university will affect the level of their loyalty towards the university. The increase in value perceptions formed by students is directly proportional to the increase in student loyalty towards the university. Students will compare the sacrifices made, including costs, energy and time, to their experiences in undergoing the e-learning process, wherein if students feel that the benefits received are comparable to or even exceed the sacrifices, there will be a sense of willingness of students to share positive words and recommendations to others regarding the university. Students' perceived value will also affect their intention to continue e-learning activities (Nugroho et al., 2019). It is important for the university to increase the perception of value from students, so that a sense of student loyalty towards the university can be created. The increase in the perceived value

of students in the end also increases their loyalty towards the university (Kilburn et al., 2016).

The level of satisfaction felt by students towards their university will also affect the level of student loyalty towards their university. The increase in student satisfaction is directly proportional to the increase in student loyalty towards the university. The overall impression formed by students concerning their university would be based on their assessment of the experience felt in the course of the e-learning process. The satisfaction obtained by students will generate a sense of loyalty, which would in turn present a positive impression. Dissatisfaction of students in undergoing e-learning will cause a sense of unwillingness to continue e-learning (Nugroho et al., 2019). It is important for the university to attend to the need for ensuring that students are satisfied with the e-learning programme undergone by them and to increase the satisfaction of students, so that a sense of student loyalty towards the university can be created (Pham et al., 2019).

The quality of service received by students in undergoing the e-learning process can affect the value perception of the benefits gained vis-a-vis the sacrifices made; and then, this will affect the level of satisfaction of students with the university. The increase in the positivity of service quality assessment for e-learning is proportional to the increase in student satisfaction with the university mediated by perceived value of students. Students have an expectation with regard to participating in learning activities at their universities, and one of them is that the quality of e-learning provided by the university must be optimal or even excellent. If the quality of e-learning received can meet the expectations that have been formed previously, in the end this will lead to a sense of satisfaction for students towards their university (Demir et al., 2020).

The value perception felt by students regarding the benefits that have been gained vis-a-vis the sacrifices that have been made in undergoing the e-learning process will create a feeling of satisfaction from the students towards the university, since it has apparently undertaken the effort to prepare the e-learning curriculum in a way that would benefit students the most. Furthermore, it will favourably affect the level of student loyalty, and also result in other desirable forms of impact, such

as "a positive impression and a sense of pride felt by students; in turn, these phenomena would result in the desire of students to share positive words about and recommend their university, as well as the desire to continue their further studies at the university. The increase in students' perceived value is proportional to the increase in student loyalty towards the university mediated by student satisfaction. The students' intentions concerning whether or not to continue the e-learning process are to a large extent contingent upon the satisfaction felt by them resultant to experiencing the e-learning services provided by the universities, and in turn, this satisfaction felt by students has an important role in mediating the perceived value felt by them (Chang, 2013; Nugroho et al., 2019).

Conclusion

The results of the research complement the results of previous studies, in which it was stated that system quality, instructor and course material quality, and administrative and support service quality had a positive and significant influence on e-learning service quality, with administrative and support service quality having the greatest influence. Furthermore, the addition of SPV variables shows that e-learning service quality has a positive and significant influence on SPV and student satisfaction. Good quality of e-learning services will increase the perception of value and the level of satisfaction of students. Furthermore, SPV has a positive and significant influence on student satisfaction and student loyalty, and student satisfaction has a positive and significant influence on student loyalty.

Furthermore, e-learning service quality has a positive and significant influence on STS with the mediation of SPV. An e-learning quality that is well-received by students will lead to the fulfilment of perceptions and expectations formed by students, and in the end, this will lead to a sense of satisfaction for students towards their university. Then, SPV has a positive and significant influence on student loyalty with the mediation of student satisfaction. The value perception formed by students in

undergoing the e-learning process will create a feeling of satisfaction from students towards the university, and in the end will affect the level of student loyalty; additionally, it would also result in other desirable forms of impact, such as a positive impression and a sense of pride felt by students; in turn, these phenomena would result in the desire of students to share positive words about and recommend their university, as well as the desire of students to more effectively participate in the learning process and the desire to continue their further studies at the university.

It is important for the university to pay attention to and improve the factors that affect the quality of e-learning services, because the level of this quality is the primary factor influencing the SPV created and sustained towards the university, especially through a comparison of the benefits gained vis-a-vis the sacrifices made; further, in conjunction with the satisfaction of students arising from the experience during the e-learning process, it will in the end increase student loyalty towards the university.

In complementing the research that has been done, there are several things that can be done for further research. In conducting the research, the selection of universities was geographically limited by focussing on the student population in Tangerang, specifically at six universities. Further research can be done by expanding the population, to obtain a wide and comprehensive picture of the results of student perceptions. Research can also be done by focussing on different perceptions of learning. The hybrid learning process that is being developed will produce new perceptions for students, so that students' perceptions with regard to their undergoing the hybrid learning process can be examined. This research focusses on the perception of learning in theory, so that research can be carried out that focusses on practical learning.

The e-learning process carried out can produce many perceptions for the research model. The research model can be developed by adding other new variables, such as the perception of students' trust in the university as formed based on the e-learning process, and the perception of learning outcomes from the e-learning process. This can be done to ensure that it is accurately ascertained whether service

quality in the e-learning process can have a good impact on student learning outcomes.

From the university's perspective, while it can, in theory, improve and enhance every aspect involved in the e-learning process, there are several specific actions that can be considered to improve this process. Universities can improve e-learning systems by providing information that helps students when they have difficulties and more clear information about the flow of e-learning. Then, the university can also improve course material and the quality of lecturers by providing facilities that help lecturers to continuously update their knowledge through training, seminars, access to new journals and meetings with experts, professionals or academicians from other universities. Collaboration is very important for each party to be able to produce new learning materials and to be able to fulfil student needs. Furthermore, the function of the student assistance service unit needs to be improved and socialised properly to enable the provision of fast service for students. The role of universities in improving all factors pertaining to the provision of e-learning services will influence the perceptions of students concerning the university's effectiveness and efficiency in providing these services, which, in turn, can be expected to influence the levels of satisfaction and loyalty of students towards the university. An e-learning service quality that is continuously improved will afford a unique experience for students in terms of knowledge acquisition, and also leave an enduring positive impression in them. Unpredictable conditions such as the COVID-19 pandemic may re-occur at any time in the future, and resultantly cause changes in the learning process. Therefore, the role of universities is very important to be able to facilitate the preparation of the e-learning process properly.

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