THE MEDIATING ROLES OF E-LEARNING STUDENT PERCEIVED VALUE ON THE RELATIONSHIP BETWEEN E-LEARNING SERVICE QUALITY ATTRIBUTES AND E-LEARNING STUDENT LOYALTY

Lam Trong Vu
National Political Publishing House, Vietnam

Long Pham
Texas A&M University-Corpus Christi, USA

Miguel Ángel Zúñiga
Morgan State University, USA

Thuy Thi Thu Nguyen
Hanoi University of Science and Technology, Vietnam

ABSTRACT

This study investigates the relationship between e-learning service quality attributes, e-learning student satisfaction with perceived value, and e-learning student loyalty. Furthermore, the mediating role of e-learning student satisfaction with perceived value on the previous relationships is also examined. Survey data were collected from 318 e-learning students in Vietnam – representing newly emerging countries. The results reveal that e-learning system quality, e-learning instructor and course materials quality, and e-learning administrative and support service quality positively relate to e-learning student satisfaction with perceived value. E-learning system quality and e-learning administrative and support service quality are positively related to e-learning student loyalty. E-learning student satisfaction with perceived value is positively related to e-learning student loyalty. Moreover, the results indicate that e-learning student satisfaction with perceived value has a mediating effect on the relationships between e-learning system quality and e-learning administrative and support service quality, and e-learning student loyalty. The findings provide insights that are helpful for universities to improve their e-learning student satisfaction and loyalty.

INTRODUCTION

Besides traditional face-to-face education, most universities around the world offer e-learning modalities (Pham et al., 2019). E- learning is becoming increasingly popular and is characterized by interactions and exchanges between students and e-learning management systems (Adedoyin & Soykan, 2023; Veeramanickam & Mohanapriya, 2016). Given the fact that universities are competing to attract e-learning students, it is important for university administrators to understand the factors that determine e-learning student loyalty because loyal students become loyal alumni who give their time, talent, and treasure to the university (Wong, 2023). Prior studies indicated that e-service quality/online service quality is a factor that determines e-customer satisfaction with perceived value and e-customer loyalty (Pham et al., 2018). It is also noted that e-customer satisfaction with perceived value is the main factor driving e-customer loyalty (Alemayehu & Chen, 2023). Due to the unique nature of e-learning in

comparison with e-commerce, which is characterized by its focus on profit, the extant literature on e-commerce may not apply to students' experiences in the context of e-learning (Pham et al., 2022). The current study contributes to the literature by examining these relationships in the e-learning context.

In addition to the contribution made by extending the literature in the e-learning context, a second contribution is made. Limited studies examine the role of different attributes of e-service quality in shaping e-customer satisfaction with perceived value and e-customer loyalty (Sun et al., 2023; Alamri, 2023). Based on this foundation, this study also contributes to the research field by examining various attributes of e-learning service quality and their influences on e-learning student satisfaction with perceived value and e-learning student loyalty. In this study, e-learning service quality is measured based on e-learning system quality, e-learning instructor and course materials quality, and e-learning administrative and support service quality (Pham et al., 2019). E-learning system quality involves ease of use, accuracy, privacy, and security. E-learning instructor and course materials quality refers to the materials used for e-learning programs and qualifications, knowledge, and experience of instructors who directly teach e-learning students. E-learning administrative and support service quality refers to the extent to which e-learning students' relevant interests and information needs are satisfactorily, quickly, and accurately met by conscientious and responsible staff.

A third contribution to the research field is made. Although prior studies examined the factors that constitute e-learning service quality, more empirical evidence that examines how e-learning service quality attributes impact e-learning student loyalty through the mediating role of e-learning student satisfaction with perceived value is needed. This study investigates both direct and indirect effects of three e-learning service quality attributes on e-learning student loyalty.

The majority of prior studies on e-learning service quality were conducted in developed countries. Understanding of e-learning service quality in developing or newly emerging countries is very limited. Among these countries, Vietnam is considered a newly emerging country, characterized by a high economic growth rate, 8.02% in 2022 (Pham et al., 2023). Responding to calls for a better understanding of the impact of e-learning service quality in developing or newly emerging countries, this current research study was conducted in the context of Vietnam, which is the fourth contribution. Furthermore, this study was implemented in the context of the COVID-19 pandemic that was spreading strongly around the world, forcing many universities to transition from the traditional face-to-face learning to e-learning modalities. The insights drawn from this study can help universities to be proactive in assuring high levels of quality of e-learning services to cope with similar pandemics or challenges that may occur in the future.

The objectives of this research study are three-fold:

1. Specifying e-learning service quality attributes perceived by e-learning students.
2. Examining the direct relationships among e-learning service quality attributes, e-learning student satisfaction with perceived value, and e-learning student loyalty.
3. Investigating the mediating roles of e-learning student satisfaction with perceived value on the relationships between e-learning service quality attributes and e-learning student loyalty.

The following sections discuss the literature review and hypotheses development, specify the research method and results, and provide discussions, conclusions, and future research directions.

LITERATURE REVIEW

In addition to the traditional face-to-face learning programs, universities also offer e-learning programs, including certificates, bachelor's, master's, and doctoral degrees (Al Issa et al., 2023). In this study, e-learning is defined as electronic learning, which refers to the delivery of education/training through digital means, primarily via the Internet. It encompasses a broad range of learning experiences that rely on the use of electronic technologies to access educational/training programs outside of a traditional classroom. This form of learning allows students to engage with course materials, interact with instructors and peers, and complete homework, quizzes, and exams based on digital platforms, including e-learning management systems, video conferencing tools, and interactive electronic resources.

Some universities, such as University of Phoenix and Liberty University, are 100% e-universities. The e-learning environment is increasingly competitive due to universities making significant efforts to attract e-learning students (Yousaf et al., 2022). Any individual can apply to participate in e-learning programs. E-learning is suitable for those who are working and need to improve their knowledge and skills, which are necessary for advancement in their career ladder. In addition, retirees or even parents of students can participate in e-learning programs. Another point, worth noting, is that with e-learning, international students do not necessarily have to travel to foreign countries to study. More specifically, international students can stay in their home country and still participate in undergraduate, master's, or doctoral programs offered by foreign universities.

To survive and improve their competitiveness in the e-learning environment, universities are making efforts to focus on improving e-learning service quality (Agyeiwaah et al., 2022). Specifically, they are interested in identifying the attributes that constitute e-learning service quality perceived by students. The fierce level of competition between universities has created a need to understand the nature of the relationship between service quality – satisfaction with perceived value - loyalty in the e-learning environment.

In this study, e-learning service quality attributes are hypothesized to be determinants of e-learning student satisfaction with perceived value and e-learning student loyalty. E-learning student satisfaction with perceived value is also hypothesized to be a factor determining e-learning student loyalty. Furthermore, the mediating role of e-learning student satisfaction with perceived value on the relationships between e-learning service quality attributes and e-learning student loyalty is also examined.

In the following section, the literature review on attributes that constitute e-learning service quality, e-learning student satisfaction with perceived value, and e-learning student loyalty is presented. The hypotheses that were developed and the research framework proposed in this study are shown in Figure 1.

E-learning Service Quality Attributes

Currently universities are pursuing strategies that center on the success of students (Pham et al., 2018). The core idea of such strategies is to view students as customers of the universities and universities must make the best efforts to deliver high quality e-learning services to students (Pham et al., 2022). With the support of advanced information and communication technology and

high-speed Internet, e-learning is becoming more popular; as a result, the question as to what factors constitute the quality of e-learning services has become very important for the public (Pham et al., 2019). Answering this question is the key to improving the overall quality of e-learning services, which can be considered as a foundation leading to e-learning student satisfaction.

Figure 1
Research Model
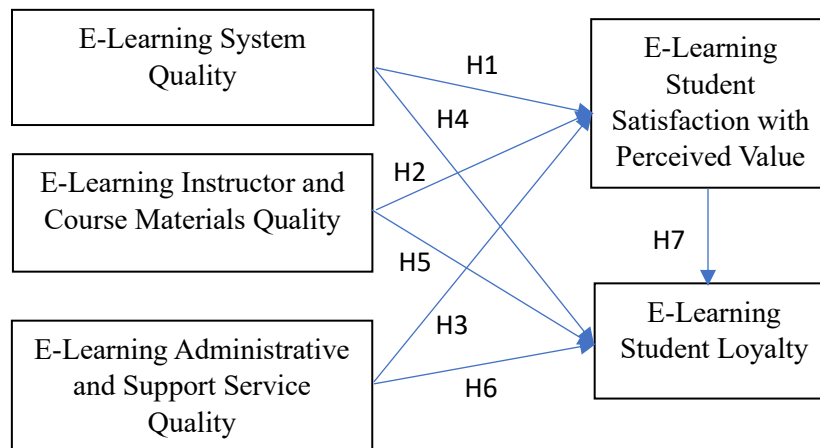
Shaik et al. (2006) argued that teaching quality and administration/support services are determinants of the quality of e-learning services. Peltier et al. (2007) found that attributes such as interactions between students and students, interactions between students and faculty members, faculty support, content and structure of courses, and ways in which learning materials are implemented play an import role in devising measurement scales for measuring the quality of e-learning services. Wang et al. (2007) pointed out that the quality of e-learning management system, information, and services are critical in achieving the success of e-learning.

In a study on e-learning acceptance, Lee (2010) asserted there is a high correlation between e-learning support service quality and e-learning student satisfaction and adoption. According to Martinez-Arguelles et al. (2013), in the e-learning setting, attributes such as teaching quality, administrative/support services, motivating factors, and learner-friendly e-learning interfaces are determinants of the quality of e-learning. Furthermore, Martinez-Arguelles and Batalla-Busquets (2016) went further to identify teaching service quality and non-teaching service quality as core components of e-learning service quality. Teaching services are core activities while non-teaching services consist of administrative/support/additional services and learner-friendly e-learning interfaces, all of which affect e-learning service quality from the student perspective.

Al-Samarraie et al. (2018) found that the quality of information, the fit between technology and work, and the quality and usefulness of the e-learning system all impact students' e-learning continuity. The study by Ozkan and Koseler (2009) found that support issues, faculty attitudes, content quality, the quality of services and the e-learning system impact e-learning quality. Goh et al. (2017) found that attributes such as course design, interactions with instructors, and interactions among students impact an e-learning system's success.

Prior research in the e-learning setting identifies different attributes which can be utilized to measure the quality of e-learning services. Each attribute or group of attributes is constructed from different perspectives and research contexts. Therefore, it is necessary to construct an

integrated framework to evaluate e-learning service quality. To the best of our knowledge, the most systematic and comprehensive scale for measuring the quality of e-learning services has been designed by Pham et al. (2019). Based on various studies on traditional business services, e-business services, traditional learning, and e-learning, Pham et al. (2019) developed a measurement scale that consists of e-learning system quality, e-learning instructor and course materials quality, and e-learning administrative/support service quality. This measurement scale is utilized in this current research study to evaluate the quality of e-learning services perceived by students and their relationships with e-learning student perceived value and e-learning student loyalty.

In the e-learning environment, student learning is achieved based on interactions and exchanges between students and e-learning systems. The e-learning system is embodied through the university's e-learning website. Therefore, e-learning system quality is considered to be equivalent to the e-learning website quality and is related to the capacity of hardware and software necessary to meet e-learning and teachers' needs. E-learning system quality is characterized by features such as ease of use, security/privacy, and accuracy. The second attribute that constitutes overall e-learning service quality is e-learning instructor and course materials quality. Universities need to improve their e-learning materials and recruit qualified instructors to satisfy students with their e-learning programs. The third attribute that constitutes overall e-learning service quality is e-learning administrative and support service quality. This attribute relates to the extent to which e-learning students' information needs before, during, and after their e-courses are fully satisfied in an expedient, accurate, and convenient manner. This requires that support and administrative teams are dedicated on one goal which is to iprioritize e-learning students' interests.

E-learning Student Satisfaction with Perceived Value and E-learning Student Loyalty

Customer satisfaction with perceived value is an important concept in the fields of marketing and management (Powers et al., 2018). Customer satisfaction should be the goal of all marketing activities (Larsen & Wright, 2020) and is important in the equity theory context (Jiang et al., 2016). Equity is defined as situations when people perceive the action of gaining value is in accordant with the costs incurred (Yang & Peterson, 2004). It should be noted that in the setting of traditional commerce/business, customers purchase goods or services through direct interactions with company employees (Van et al., 2021). Customer satisfaction with perceived value is determined on the grounds of calculating output-to-input ratios of customers and firms. Benefits are considered outputs and costs are considered inputs (Pham et al., 2023).

Perceived costs can be monetary costs or non-monetary. For example, non-monetary costs may include the time that a consumer needs to find relevant information on preferred products/services. Based on the collected information, the consumer makes a decision to buy or not buy the goods/services. Non-monetary costs can also include frustration or stress experienced throughout the entire interaction process with salespeople.

The concept of customer satisfaction with perceived value is useful not only in the setting of traditional business, but also in the setting of e-business (Pham et al., 2020). The setting of e-business is different from the setting of traditional business in the sense that customer purchases are characterized by interactions with firms' websites (Bui et al., 2020). Studies in these two environments suggest that customer satisfaction with perceived value affects firms' profitability and long-term success.

According to Parasuraman and Grewal (2000), service quality is a factor that determines customer satisfaction with perceived value. In spite of the lack of consensus of what defines service

quality, there is an increasing consensus that service quality is evaluated using gaps between customer service expectations and actual experiences (Sailors et al., 2019). SERVQUAL is a popular service quality measurement scale in the setting of traditional business (Parasuraman et al., 1991). This measurement scale includes tangibles, responsiveness, reliability, assurance, and empathy. Each attribute is expected to have different impacts on overall service quality perceived by customers.

In the setting of e-business, various attributes have different effects on overall e-service quality perceived by e-customers (Pham et al., 2020; Thinh et al., 2019; Van et al., 2020). Liu and Arnett (2000) point out that playfulness, system use, the quality of information, and the quality of system are determinants of a website's success. Sohn (2000) identifies ease of use, trustfulness, interactions, delivery speed, web page contents, and consistency as determinants of the overall quality of e-service. Jun and Cai (2001) underscore access, responsiveness, and reliability determining the quality of e-banking service.

Evidence from empirical studies indicates that service quality has a positive impact on customer satisfaction with perceived value in both traditional business and e-business settings (Pham et al., 2023). Therefore, evaluating e-learning service quality may be accomplished using the marketing/management perspective because e-learning students may be considered as the firms' customers and universities as the firms. Universities are required to make their best effort to deliver e-learning students high quality e-learning services in an efficient and effective manner. Prior studies in both traditional business and e-business settings indicate that each service quality attribute can have a different positive impact on customer satisfaction with perceived value. Therefore, in the e-learning environment, the following three hypotheses are proposed:

> **H1:** *E-learning system quality is positively related to e-learning student satisfaction with perceived value.*

> **H2:** *E-learning instructor and course materials quality is positively related to e-learning student satisfaction with perceived value.*

> **H3:** *E-learning administrative and support service quality is positively related to e-learning student satisfaction with perceived value.*

In the business environment, whether traditional or e/online, service quality serves as one of the most important factors determining the success of a firm (Pham et al., 2020). The concept of customer loyalty is based on a customer's goal achievement (Huy et al., 2019; Zhu et al., 2023). Loyalty is impacted by whether the customer is satisfied or disappointed with services provided by the firm (Jois et al., 2022; Pham et al., 2018). In general, customer loyalty is formed on the basis of comparison of perceived outcomes and expectations about the services received (Bapat & Kannadhasan, 2022). In other words, perceived outcomes and expectations can be two important factors impacting customer loyalty (Wei, 2023). When perceived outcomes exceed expectations, customers become loyal to the service providing firm (Smith, 2021).

Modern communication and information technologies are being used in the educational environment and are revolutionizing higher education institutions (Pham et al., 2022). With e-devices, especially portable e-devices and wireless Internet connection, students' learning can take place in a simple, convenient way, not limited by space and time. In other words, e-learning is increasingly popular (Pham et al., 2019). Higher education institutions are implementing strategies

that focus on the success of students. They view students as firms' customers and support the view that student loyalty with the e-learning is the key to becoming smart and successful universities (Pham et al., 2018).

There are similarities between running a university and running a business (Kilburn et al., 2016). Universities offer e-learning to students and e-students are the customers of these universities (Pham et al., 2018). It should be noted that e-learning student loyalty is important due to several factors. Firstly, tuition fees are one of the important funding sources that keep universities running, so if e-students are loyal, they will continue their degree programs and continue paying tuition fees. Secondly, loyal students are likely to develop long-term commitments and to provide positive feedback about the university (Bakir et al., 2020). Thirdly, loyal students can become ambassadors or free advertisers of the university after they graduate, making the university's image more attractive in the eyes of the public, and can help the university attract many new students to enroll in the university (Petersen et al., 2021).

Based on the understanding of customer loyalty in an e-business environment, student loyalty with e-learning is assessed in terms of the way students achieve e-learning related goals. Specifically, there are two possible scenarios. In the first case, if students' e-learning experiences are more positive than their expectations, they will be satisfied with and loyal to e- learning. If students' e-learning experiences are less positive than their e-learning expectations, they will not be satisfied and will not be loyal to e-learning.

With the great advancements in information and communication technology and Internet infrastructures, universities have more opportunities to build e-learning programs in more efficient and effective ways (Kuo et al., 2014). These programs are packed with powerful and user-friendly attributes to enhance interactions between faculty and students as well as among students. However, it should be noted that technologies by themselves are not a guarantee of the success of e-learning programs (Pham et al., 2019). There is a lot of work to be done to improve e-learning service quality with the aim of achieving e-learning student loyalty. Therefore, related to the e-learning setting, the following three hypotheses are proposed:

H4: *E-learning system quality is positively related to e-learning student loyalty.*

H5: *E-learning instructor and course materials quality is positively related to e-learning student loyalty.*

H6: *E-learning administrative and support service quality is positively related to e-learning student loyalty.*

Customer loyalty results in customers having greater intentions to continue or increase interactions/purchases with a company (Frechette & Wingate, 2022; Taylor & Sirmans, 2019; Pham et al., 2012). Customer loyalty can result in a customer's desire to recommend a preferred firm to other people (Pham et al., 2014). Prior research indicates that in the traditional commercial environment, customer satisfaction with perceived value is positively related to customer loyalty (Parasuraman & Grewal, 2000). In the e-commerce setting, customer satisfaction with perceived value serves as an important factor impacting customer loyalty (Badghish et al., 2018). For example, in the context of e-banking, customer satisfaction with perceived value is positively related to customer loyalty. For instance, a bank might set up a high price or fee on a given product while attaching distinct services to this product. In this way, the bank's customers will be satisfied

with perceived value towards the product in comparison with similar products offered by other banks. Consistent with this view, in the context of e-learning, the following hypothesis is proposed:

H7: *E-learning student satisfaction with perceived value is positively related to e-learning student loyalty.*

Parasuraman and Grewal (2000) proposed the quality-satisfaction-loyalty causal model in the setting of traditional business. This model has been applied in the setting of e-business (Jiang et al., 2015; Yang & Peterson, 2004). In addition, it has also been applied in the e-government setting (Pham et al., 2023). To be in line with these studies, in the context of e-learning, the following hypotheses (not shown in Figure 1) are proposed:

H8a: *E-learning student satisfaction with perceived value plays a mediating role on the relationship between e-learning system quality and e-learning student loyalty.*

H8b: *E-learning student satisfaction with perceived value plays a mediating role on the relationship between e-learning instructor and course materials quality and e-learning student loyalty.*

H8c: *E-learning student satisfaction with perceived value plays a mediating role on the relationship between e-learning administrative and support service quality and e-learning student loyalty.*

METHOD AND RESULTS

This study uses the survey method to collect data. The research model presents the relationships among e-learning system quality, e-learning instructor and course materials quality, e-learning administrative and support service quality, e-learning student satisfaction with perceived value, and e-learning student loyalty. The measurement scales used were borrowed and adapted from previous studies, which have been confirmed for reliability and validity. Specifically, the e-learning system quality measurement scale consists of 7-items. The e-learning instructor and course materials quality measurement scale includes 7-items. The e-learning administrative and support service quality consists of 7-items. These three measurement scales were adapted from Pham et al. (2019). The e-learning student satisfaction with perceived value measurement scale has 5-items, which was adapted from Jiang et al. (2015), while the e-learning student loyalty measurement scale includes 5-items, which was adapted from Yang and Peterson (2004). Some adjustments were made to these measurement scales to be suitable in the e-learning context. In addition, demographic information was also included in the questionnaire.

The preliminary questionnaire was sent to four instructors with e-learning teaching experience and five students who were enrolled in at least one e-course at universities in the US to evaluate the content and semantics. Based on the feedback from these instructors and students, minor changes were made to improve the questionnaire.

The questionnaire was then translated into Vietnamese by an instructor who was fluent in both Vietnamese and English and had more than 10 years of e-teaching experience. The Vietnamese version of the questionnaire was sent to five Vietnamese students with at least one year of e-learning experience. All five students affirmed that the Vietnamese version of the

questionnaire was completely understandable. Afterward, the Vietnamese version of the questionnaire was back-translated into English by another instructor fluent in both Vietnamese and English and had e-learning teaching experience. This translated version was compared with the original English version. The results indicated that they were completely consistent and understandable.

The Vietnamese version of the questionnaire was sent to students with e-learning experience at one university in Hanoi, the capital of Vietnam. These students were required to participate in e-courses, especially during the COVID-19 pandemic which impacted all the countries in the world, including Vietnam, in 2020 - 2021.

All measurement scales were 5-point Likert-type scales, where 1 is "strongly disagree" and 5 is "strongly agree." A total of 332 students completed the questionnaire. During the data cleaning process, 14 responses were eliminated due to missing values or incomplete information. As a result, 318 responses were used in the subsequent statistical analysis.

Table 1 presents the demographic information. The male students account for 50.6%. Regarding age, 19-year-olds account for 17.9%; 20-year-olds account for 43.1%; 21-year-olds account for 31.1%; 22-year-olds account for 3.4%; and over 22-year-olds account for 4.5%. First-year students account for 0.6%; second-year students account for 2.8%; third-year students account for 69.2%; and fourth-year students account for 27.4%. Regarding the Internet use, 2 - 5 times a week account for 4.1%; 1 – 4 times a day account for 44.3%; 5 – 8 times a day account for 38.1%; and 9 times or more a day account for 13.5%. Regarding the usage of e-learning system, less than 5 months accounts for 10.4%; 5 months – one year account for 56.6%; 2 years – 3 years account for 27%; and > 3 years account for 6%.

Because the survey method was used in this study, common response bias was analyzed using a *t*-test, as suggested by Armstrong and Overton (1977). The results from the *t*-test indicated there were no statistically significant differences between early and late respondents in terms of measurement items and demographic information. This suggests that there was no problem of common response bias in this study.

The statistical methods used in this study included descriptive statistics, correlation coefficients, factor analysis, and structural equation modeling. Estimating parameters and testing hypotheses were performed using the SEM method. Statistical software used included Excel, SPSS 29, and SmartPLS 4.

Before analyzing the structural model and testing hypotheses, the measurement model was examined as suggested by Bollen (1989) in terms of reliability and validity. Descriptive statistics were calculated, indicating no outliers. For observed variables, missing values were replaced by average ones. Common method bias was examined based on the one-factor analysis method suggested by Podsakoff et al. (2003). The single-factor analysis method indicated that when holding all measurement items on one factor, less than 50% of the variation was explained by that factor. This result proved that common method bias did not exist. Furthermore, to examine whether multicollinearity exists, the VIF coefficients were calculated. Such values were less than 5. This again indicated that common method bias was not an issue in this study.

The measurement model includes abstract variables and their observed variables that were analyzed based on three criteria: reliability, convergent validity, and discriminant validity. The reliability of the abstract variables and their measurement items were expressed through the Cronbach alpha coefficients, composite reliability coefficients, and AVE coefficients. Table 2 shows the Cronbach alpha coefficients greater than 0.7, composite reliability coefficients greater

than 0.7, and AVE coefficients greater than 0.5. These facts confirm the reliability of the measurement model.

Table 1
Demographic Information

Attributes		Count	Proportion (%)
Gender	Male	161	50.6
	Female	157	49.4
	Total	318	100.0
Age	19 years old	57	17.9
	20	137	43.1
	21	99	31.1
	22	11	3.4
	> 22	14	4.5
	Total	318	100.0
Student classification	Freshman	2	0.6
	Sophomore	9	2.8
	Junior	220	69.2
	Senior	87	27.4
	Total	318	100.0
Internet usage	2 – 5 times a week	13	4.1
	1 – 4 times a day	141	44.3
	5 – 8 times a day	121	38.1
	9 times or more a day	43	13.5
	Total	318	100.0
E-learning system usage	Less than 5 months	33	10.4
	5 months – 1 year	180	56.6
	2 years – 3 years	86	27.0
	> 3 years	19	6.0
	Total	318	100.0

Convergent validity was analyzed based on the factor loadings of measurement items on the corresponding abstract variable. These loading factors were all greater than 0.7 and statistically significant at *p*-value < 0.01, indicating the convergent validity of the measurement model. Discriminant validity was analyzed based on comparing the square root values of the AVE coefficients of the factors with the correlation coefficients of the corresponding factor and other factors. Table 3 shows that the square root values of AVEs are all larger than the corresponding correlation coefficients, indicating discriminant validity.

Table 2

Factor Loadings, Cronbach's Alpha, and Average Variance Extracted Values

Constructs	Items	Factor Loadings	Reliability (Cronbach's Alpha)	Average Variance Extracted (AVE)
E-learning System Quality	ELSQ1: The layout of the information at my university's e-learning website is easy to follow.	0.835	0.926	0.687
	ELSQ2: My university's e-learning course website provides me with valuable information.	0.873		
	ELSQ3: My university's e-learning course website allows me to find information easily.	0.869		
	ELSQ4: The information on my university's e-learning website is up-to-date.	0.871		
	ELSQ5: I feel secure in providing sensitive information for e-transactions through my university's e-learning website.	0.740		
	ELSQ 6: With my e-learning, when my university promises to do something by a certain time, it does so.	0.815		
	ELSQ7: I do not encounter long delays when searching for information on my university's e-learning website.	0.791		
E-learning Instructor and Course Materials Quality	ELICMQ1: My university's e-learning course materials are practical.	0.822	0.937	0.711
	ELICMQ2: My university's e-learning course materials challenge me to think.	0.848		
	ELICMQ3: My university's e-learning course materials are useful.	0.822		
	ELICMQ4: My university's learning course assignments/exams are reasonable in length and difficulty.	0.867		
	ELICMQ5: My university's e-learning instructors are knowledgeable in their fields.	0.840		
	ELICMQ6: My university's e-learning instructors are well prepared and organized.	0.836		

	ELICMQ7: My university's e-learning instructors have the students' best long-term interests in mind.	0.868		
E-learning Administrative and Support Service Quality	ELASSQ 1: My university gets its e-learning support service right the first time.	0.795	0.916	0.661
	ELASSQ 2: With my e-learning, my university's staff tells me exactly when the service will be performed.	0.882		
	ELASSQ 3: For my e-learning, my university's staff gives me prompt service.	0.860		
	ELASSQ 4: For my e-learning, my university's staff has my best interests at heart.	0.846		
	ELASSQ 5: For my e-learning, my university's staff understands my specific needs.	0.745		
	ELASSQ 6: For my e-learning, my university's staff gives me personal attention.	0.749		
	ELASSQ 7: For my e-learning, the help desk of my university has convenient operating hours.	0.804		
E-learning Student Satisfaction with Perceived Value	ELSSPV 1: E-learning programs offer attractive tuition costs/fees.	0.887	0.938	0.762
	ELSSPV 2: E-learning programs charge me fairly.	0.849		
	ELSSPV 3: E-learning programs provide more free services.	0.899		
	ELSSPV 4: Comparing what I pay to what I get, I think e-learning programs provided me with good value.	0.830		
	ELSSPV 5: Comparing what I pay to what I might get from traditional face-to-face learning programs, I think e-learning programs provide me with good value.	0.877		
	ELSSPV 6: Comparing with traditional face-to-face learning programs, it is wise to choose e-learning programs.	0.892		
E-learning Student Loyalty	ELSL 1: I will introduce my university's e-learning programs to others who need my advice about e-learning services.	0.801	0.903	0.721
	ELSL 2: I will encourage my friends and relatives to study e-learning programs at my university.	0.854		

ELSL 3: I share positive features of my university's e-learning programs.	0.863
ELSL 4: I have an intention to continue studying e-learning programs at my university in the future.	0.866
ELSL 5: I will write positive messages about my university's e-learning programs in online forums.	0.860

Note: ELSQ – E-Learning System Quality; ELICMQ – E-Learning Instructor and Course Materials Quality; ELSSPV – E-Learning Student Satisfaction with Perceived Value; ELSL – E-Learning Student Loyalty; CR – Composite Reliability; CA – Cronbach's Alpha; AVE – Average Variance Extracted. All loading values are statistically significant at p-value < 0.01.

Table 3
Discriminant Validity – Fornell-Larcker Criterion

	ELASSQ	ELICMQ	ELSL	ELSSPV	ELSQ
E-Learning Administrative and Support Service Quality	0.813				
E-Learning Instructor and Course Materials Quality	0.354	0.843			
E-Learning Student Loyalty	0.5	0.556	0.849		
E-Learning Student Satisfaction with Perceived Value	0.369	0.553	0.659	0.873	
E-Learning System Quality	0.427	0.618	0.69	0.618	0.829

Note: ELSQ – E-Learning System Quality; ELICMQ – E-Learning Instructor and Course Materials Quality; ELSSPV – E-Learning Student Satisfaction with Perceived Value; ELSL – E-Learning Student Loyalty. Square root of AVE values are on the diagonal.

The HTMT (Heterotrait-Monotrait Ratio) values were further analyzed to determine discriminative validity. Table 4 shows that the HTMT values are all less than 0.85, indicating convergent validity.

Table 4: Discriminant Validity – Heterotrait-Monotrait Ratio (HTMT)

	ELASSQ	ELICMQ	ELSL	ELSSPV	ELSQ
E-Learning Administrative and Support Service Quality					
E-Learning Instructor and Course Materials Quality	0.376				
E-Learning Student Loyalty	0.551	0.597			
E-Learning Student Satisfaction with Perceived Value	0.398	0.585	0.716		
E-Learning System Quality	0.463	0.657	0.754	0.664	

Note: ELSQ – E-Learning System Quality; ELICMQ – E-Learning Instructor and Course Materials Quality; ELSSPV – E-Learning Student Satisfaction with Perceived Value; ELSL – E-Learning Student Loyalty.

After the measurement model was confirmed in terms of reliability, convergent validity, and discriminant validity, the structural model was analyzed to estimate parameters and test hypotheses. The estimated path coefficients, *p*-values, and R^2 coefficients are shown in Figure 2. The path coefficients of e-learning system quality, e-learning instructor and course materials quality, e-learning administrative and support service quality to e-learning student satisfaction with perceived value and e-learning student loyalty are positive. The path coefficient from e-learning student satisfaction with perceived value to e-learning student loyalty is positive. The model explains 43.7% of the variability of e-learning student satisfaction with perceived value and 60.3% of the variability of e-learning student loyalty.

Figure 2
Path Coefficient Estimates, *p*-values, and R^2

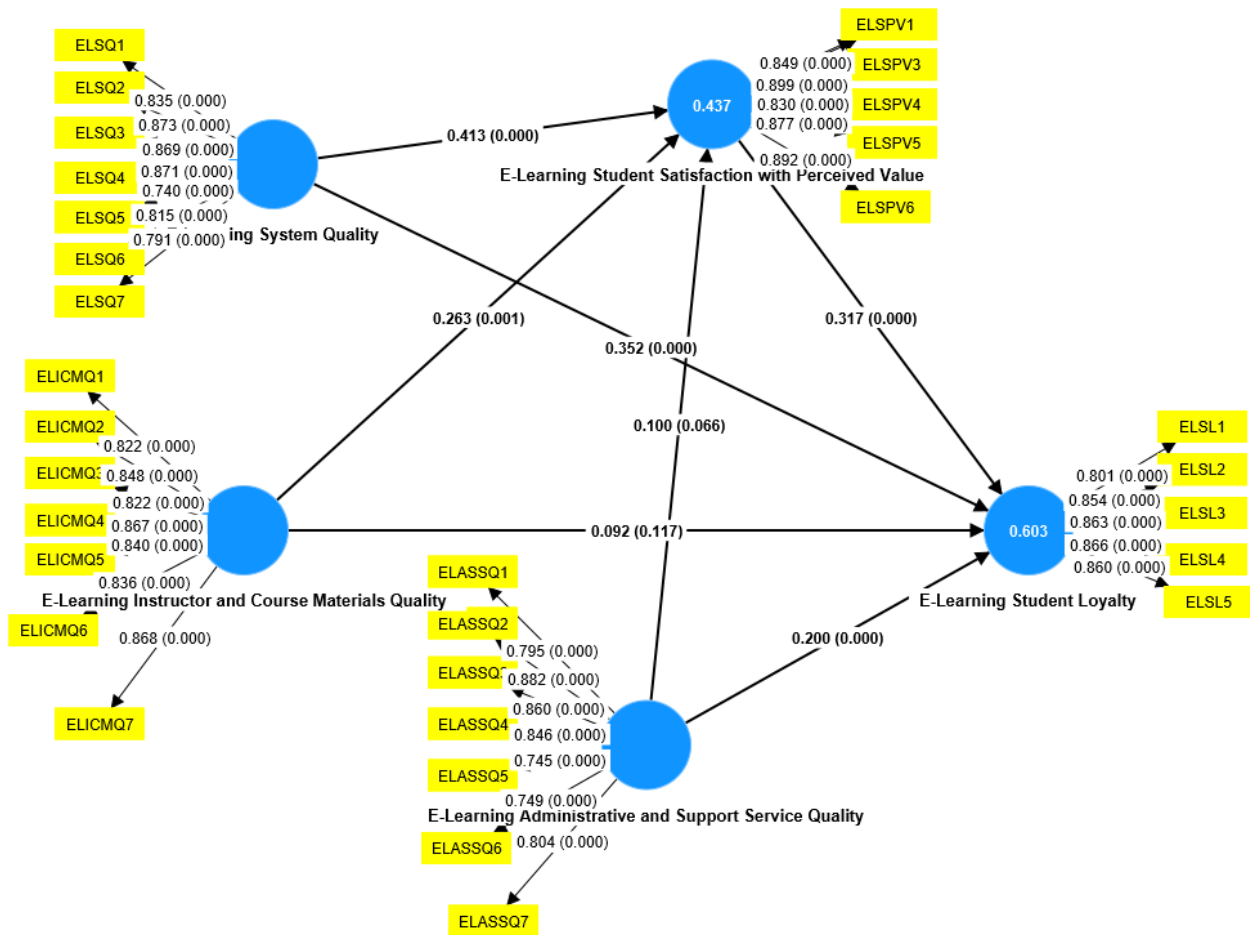
Figure 2 also shows the factor loadings and *p*-values of the measurement items constituting the abstract variables. All the factor loadings are greater than 0.7 and *p*-values are less than 0.0001. The path coefficients of the abstract variables in the structural model have *p*-values less than 0.001 or 0.1, except for 0.117 for the path from e-learning instructor and course material quality to e-learning student loyalty.

Table 5 presents the f^2 and Q^2 values in addition to R^2 values. The Q^2 values for e-learning student loyalty and e-learning student satisfaction with perceived value are 0.527 and 0.414, respectively. These values indicate a strong degree of predictive relevance (Hair et al., 2013).

Table 5
R^2, f^2, and Q^2 Values

Predictor	Outcome	R^2	f^2	Q^2
ELSQ	ELSL	0.603	0.151	0.527
ELICMQ			0.012	
ELASSQ			0.080	
ELSSPV			0.143	
ELSQ	ELSSPV	0.437	0.172	0.414
ELICMQ			0.074	
ELASSQ			0.014	

Note: ELSQ – E-Learning System Quality; ELICMQ – E-Learning Instructor and Course Materials Quality; ELSSPV – E-Learning Student Satisfaction with Perceived Value; ELSL – E-Learning Student Loyalty.

The f^2 value is the change in R^2 when an exogenous variable is removed from the model. In other words, the f^2 is effect size. The values of f^2 range from 0.012 to 0.172. This indicates that majority of exogenous variables have large or medium effect sizes (Cohen, 1988).

The path coefficient from e-learning service quality to e-learning student satisfaction with perceived value is 0.413 (*t*-value, 6.316; *p*-value < 0.0001), indicating that H1, e-learning system quality is positively related to e-learning student satisfaction with perceived value, is statistically supported.

The path coefficient from e-learning instructor and course materials quality to e-learning student satisfaction with perceived value is 0.263 (*t*-value, 3.436; *p*-value = 0.001). This indicates that H2, e-learning instructor and course materials quality is positively related to e-learning student satisfaction with perceived value, is statistically supported. The path coefficient from e-learning administrative and support service quality to e-learning student satisfaction with perceived value is 0.100 (*t*-value, 1.841, *p*-value = 0.066). This indicates that H3, e-learning administrative and support service quality is positively related to e-learning student satisfaction with perceived value, is statistically supported.

The path coefficient from e-learning system quality to e-learning student loyalty is 0.352 (*t*-value, 5.430; *p*-value < 0.0001). This indicates that H4, e-learning system quality is positively related to e-learning student loyalty, is statistically supported. The path coefficient from e-learning instructor and course materials quality to e-learning student loyalty is 0.092 (*t*-value, 1.568; *p*-value = 0.117). This indicates that H5, e-learning instructor and course materials quality is positively related to e-learning student loyalty, is not statistically supported. The path coefficient from e-learning administrative and support service quality to e-learning student loyalty is 0.200 (*t*-value, 3.559; *p*-value < 0.0001). This indicates that H6, e-learning administrative and support service quality is positively related to e-learning student loyalty, is statistically supported.

The path coefficient from e-learning student satisfaction with perceived value to e-learning student loyalty is 0.317 (*t*-value, 4.989; *p*-value < 0.0001). This indicates that H7, e-learning student satisfaction with perceived value is positively related to e-learning student loyalty, is statistically supported.

The Bootstrapping method with 5,000 subsamples was conducted to test the mediating roles of e-learning student satisfaction with perceived value. Table 6 presents the results from the tests. The path coefficient, e-learning system quality – e-learning student satisfaction with perceived value – e-learning student loyalty, is 0.131 (*t*-value, 3.88; *p*-value, 0.000). This indicates that H8a, e-learning student satisfaction with perceived value plays a mediating role on the relationship between e-learning system quality and e-learning student loyalty, is statistically supported. The path coefficient, e-learning instructor and course materials quality – e-learning student satisfaction with perceived value – e-learning student loyalty, is 0.083 (t-value, 3.111; *p*-value, 0.002). This indicates that H8b, e-learning student satisfaction with perceived value plays a mediating role in the relationship between e-learning instructor and course materials quality and e-learning student loyalty, is statistically supported.

Table 6

The Mediating Roles of E-learning Student Satisfaction with Perceived Value

Total Effect (ELSQ – ELSL)		Direct Effect (ELSQ – ELSL)		Indirect Effect of ELSQ on ELSL					
Coefficient	*p*-value	Coefficient	*p*-value	H8a	Coefficient	SD	*t*-value	*p*-value	BI [2.5%; 97.5%]
0.483	0.000	0.352	0.000	ELSQ – ELSSPV - ELSL	0.131	0.034	3.88	0.000	[0.069; 0.2]
Total Effect (ELICMQ – ELSL)		**Direct Effect (ELICMQ – ELSL)**		**Indirect Effect of ELICMQ on ELSL**					
Coefficient	*p*-value	Coefficient	*p*-value	H8b	Coefficient	SD	*t*-value	*p*-value	BI [2.5%; 97.5%]
0.175	0.006	0.092	0.117	ELICMQ – ELSSPV - ELSL	0.083	0.027	3.111	0.002	[0.037 – 0.142
Total Effect (ELASSQ – ELSL)		**Direct Effect (ELASSQ – ELSL)**		**Indirect Effect of ELASSQ on ELSL**					
Coefficient	*p*-value	Coefficient	*p*-value	H8c	Coefficient	SD	*t*-value	*p*-value	BI [2.5%; 97.5%]
0.232	0.000	0.2	0.000	ELASSQ – ELSSPV - ELSL	0.032	0.021	1.533	0.125	[-0.003; 0.078]

Note: ELSQ – E-Learning System Quality; ELICMQ – E-Learning Instructor and Course Materials Quality; ELSSPV – E-Learning Student Satisfaction with Perceived Value; ELSL – E-Learning Student Loyalty.

The path coefficient, e-learning administrative and support service quality – e-learning student satisfaction with perceived value – e-learning student loyalty, is 0.032 (*t*-value, 1.533; *p*-value, 0.125). This indicates that H8c, e-learning student satisfaction with perceived value plays a

mediating role on the relationship between e-learning administrative and support service quality attributes and e-learning student loyalty, is not statistically supported.

DISCUSSION

The objectives of this current study are to examine the relationships among e-learning system quality, e-learning instructor and course materials quality, e-learning administrative and support service quality, e-learning student satisfaction with perceived value, and e-learning student loyalty. Moreover, the mediating roles of e-learning student satisfaction with perceived value in transmitting the impacts of e-learning system quality, e-learning instructor and course materials quality, and e-learning administrative and support service quality to e-learning student loyalty are also investigated. The results from the hypotheses testing are presented in Table 7.

Table 7
Hypotheses Testing Results

Relationship	Hypothesis	Path Coefficient	*t*-Value	*p*-Value	Result
ELSQ – ELSSPV	H1	0.413	6.316	0.000	Accepted
ELICMQ – ELSSPV	H2	0.263	3.436	0.001	Accepted
ELASSQ – ELSSPV	H3	0.100	1.841	0.066	Accepted
ELSQ – ELSL	H4	0.352	5.430	0.000	Accepted
ELICMQ – ELSL	H5	0.092	1.568	0.117	Rejected
ELASSQ - ELSL	H6	0.200	3.559	0.000	Accepted
ELSSPV - ELSL	H7	0.317	4.989	0.000	Accepted
ELSQ – ELSSPV - ELSL	H8a	0.131	3.88	0.000	Accepted
ELICMQ – ELSSPV - ELSL	H8b	0.083	3.111	0.002	Accepted
ELASSQ – ELSSPV - ELSL	H8c	0.032	1.533	0.125	Rejected

Note: ELSQ – E-Learning System Quality; ELICMQ – E-Learning Instructor and Course Materials Quality; ELSSPV – E-Learning Student Satisfaction with Perceived Value; ELSL – E-Learning Student Loyalty.

Today, information and communication technologies are integrated into universities' learning management systems, making e-learning increasingly popular (Uppal et al., 2018). With the benefits for both universities and students, e-learning is expected to continue to grow and continue transforming traditional universities into smart universities (Ali et al., 2022).

Although universities have invested significantly in e-learning infrastructures, not all students are satisfied with perceived value from e-learning. One of the main reasons is the quality of e-learning services (Malanga et al., 2022).

There are existing studies on e-learning in general and e-learning service quality in particular. However, there is a lack of research studies examining the relationships among e-learning service quality attributes, e-learning student satisfaction with perceived value, and e-learning student loyalty. This study uses the chain model, service quality – satisfaction with perceived value – loyalty, to fill the research gaps in the context of Vietnam – a newly emerging country. This study has theoretical and practical contributions.

This study examines the role of each of e-learning service quality attributes. The results show that e-learning system quality, e-learning instructor and course materials quality, and e-learning administrative and course materials quality are positively related to e-learning student satisfaction with perceived value. These results are compared with that of previous studies conducted in traditional commerce, e-commerce, and e-government contexts. Table 8 presents service quality attributes and their relationships with satisfaction with perceived value in the different contexts.

Table 8

Relationships between Service Quality Characteristics and
Satisfaction with Perceived Value in Different Contexts

Traditional Commerce Context (Parasuraman and Grewal, 2000)	E-Commerce Context (Jiang et al., 2015)	E-Government Context (Pham et al., 2023)	E-Learning Context (The current study)
Responsiveness (Yes)	Product Portfolio (Yes)	Trustworthiness (Yes)	E-Learning System Quality (Yes)
Empathy (Yes)	Security (Yes)	Fulfillment (Yes)	E-Learning Instructor and Course Materials Quality (Yes)
Tangibles (Yes)	Ease of Use (Yes)	Citizen Care (No)	E-Learning Administrative and Support Service Quality (Yes)
Assurance (Yes)	Reliability (Yes)	Security and Privacy (No)	
Reliability (Yes)	Care (Yes)	Ease of Interaction (No)	

According to Parasuraman and Grewal (2000), in the traditional commercial environment, there is a positive relationship between service quality and customer satisfaction with perceived value. However, Parasuraman and Grewal (2000) did not test this hypothesis using empirical data. In the e-commerce environment, five service quality attributes namely product portfolio, security, ease of use, reliability, and care are positively related to customer satisfaction with perceived value (Jiang et al., 2015). In the e-government environment, Pham et al. (2023) identify five service quality attributes namely trustworthiness, fulfillment, citizen care, security and privacy, and ease

of interaction. However, only trustworthiness and fulfillment have a positive influence on citizen satisfaction with perceived value.

The results of this study are consistent with that of previous research in the e-learning environment by indicating that e-learning service quality includes three attributes: e-learning system quality, e-learning instructor and course materials quality, and e-learning administrative and support service quality (Pham et al., 2019).

This study also indicates that service quality has a positive impact on loyalty. However, not all service quality attributes are positively related to loyalty. Specifically, among the three e-learning service quality attributes, only e-learning system quality and e-learning administrative and support service quality are positively related to e-learning student loyalty. It is interesting to note that although e-learning instructor and course materials quality do not have a direct impact on e-learning student loyalty, it does indirectly impact e-learning student loyalty through e-learning student satisfaction with perceived value.

What makes this study different from prior studies in the field is that this study examines the mediating role of e-learning student satisfaction with perceived value in the relationships between e-learning service quality attributes and e-learning student loyalty. The results indicate that e-learning system quality not only has a direct impact but also an indirect impact on e-learning student loyalty through e-learning student satisfaction with perceived value. Furthermore, e-learning instructor and course materials quality only has an indirect impact on e-learning student loyalty through e-learning student satisfaction with perceived value. This evidence provides a full picture of the mechanisms that influence e-learning student loyalty and emphasizes the importance of e-learning student satisfaction with perceived value.

This study has managerial and practical contributions. The three e-learning service quality attributes in this study are important because they have an indirect, direct, or both direct and indirect influence on e-learning student loyalty. Therefore, universities implementing e-learning programs must pay attention to e-learning system quality, e-learning instructor and course materials quality, and e-learning administrative and support service quality in efforts to satisfy e-learning students in order to increase their loyalty to e-learning programs and the university in question.

E-learning system quality is related to ease of use, accuracy, and privacy and confidentiality. Ease of use refers to the degree to which a student's use of an e-learning system does not require significant effort. The level of accuracy represents the degree to which interactions and exchanges between students and the e-learning system, between students and instructors, and among students are carried out accurately. Therefore, to realize ease of use and accuracy, universities are required to invest in modern technology platforms for e-learning programs. The information on the e-learning website should be arranged accurately, logically, reasonably, and aesthetically so that students' search for necessary information can be conducted in a simple, effective, and efficient way.

It is worth noting that before, during and after the e-learning process, students interact and exchange information with the e-learning system. They may be asked to provide personal and financial information, for example when paying tuition fees, they might have to provide credit or debit card information. Therefore, universities' e-learning systems must be upgraded, updated, and encrypted using advanced security algorithms to ensure that students' personal and financial information is protected and not risk the personal data to be compromised. These actions are ways to improve the quality of the e-learning system.

Besides e-learning system quality, e-learning instructor and course materials quality play an important role in bringing the success to e-learning programs. To increase the e-learning student base, universities should recruit qualified instructors. The instructors are required to have not only theoretical but also practical knowledge. Universities and instructors must always put the interests of students first and be passionate about imparting knowledge to students. Furthermore, e-learning materials must be continuously updated to ensure that the content of courses is closely aligned and consistent with changes taking place in reality. In this regard, universities should be encouraged to become strategic partners with leading publishers to provide faculty and e-learning students with access to modern e-learning resources that can be used to satisfy the instructors and e-learning students' expectations and demands.

Finally, the success of e-learning programs offered by universities is indispensable without e-learning administrative and support service quality. Before, during, and after the e-learning process, students interact and exchange information with universities through e-learning systems. Therefore, e-learning students' demand for relevant information is very high. For these processes to run smoothly, quickly, and accurately, a dedicated and responsible staff who always puts the interests of e-learning students first is required. With this type of staff, e-learning students' expectations and demands will have a higher likelihood to be satisfied.

When the three e-learning service quality attributes, e-learning system quality, e-learning instructor and course materials quality, and e-learning administrative and support service quality, are adequately addressed, e-learning students will perceive this as an added value, leading to e-learning student satisfaction and loyalty. Satisfied and loyal e-learning students will become ambassadors of universities and e-learning programs and will happily spread and promote the benefits of e-learning to their friends, colleagues, and family members.

LIMITATIONS AND FUTURE RESEARCH

E-learning is becoming increasingly popular in many countries, especially during and after the COVID-19 pandemic. Although e-learning is expected to bring benefits to both universities and e-learning students, people are concerned about whether e-learning students are satisfied with perceived value from e-learning. Furthermore, e-learning service quality is also another concern.

In response to calls for more research on the success of e-learning, this study is the first to use the chain model, service quality – satisfaction with perceived value - loyalty, suggested by Parasuraman and Grewal (2000), to examine the relationships among e-learning system quality, e-learning instructor and course materials quality, e-learning administrative and support service quality, e-learning student satisfaction with perceived value, and e-learning student loyalty. In particular, the mediating role of e-learning student satisfaction with perceived value is confirmed in this study, this is the differentiating impact and contribution of this study compared to related studies.

The results indicate that e-learning system quality, e-learning instructor and course materials quality, and e-learning administrative and support service quality have a direct positive impact on e-learning student satisfaction with perceived value. E-learning system quality and e-learning administrative and support service quality have a direct positive impact on e-learning student loyalty. E-learning student satisfaction with perceived value has a direct positive impact on e-learning student loyalty. Furthermore, the mediating roles of e-learning student satisfaction with perceived value in the relationship between e-learning system quality and e-learning student loyalty and in the relationship between e-learning administrative and support service quality and e-learning student loyalty are statistically supported.

Similar to other studies, this study has limitations. The first limitation is that this study was conducted in a single country, Vietnam. Although Vietnam may be representative of newly emerging countries, generalizing the results of this study to other newly emerging countries should be conducted with caution. Future studies could expand the research context by considering other newly emerging countries and comparing the relationships in the research model among such countries.

The second limitation is that besides the mediating role of e-learning student satisfaction with perceived value, there may be other mediating variables, for example e-learning student technology readiness. Future studies can integrate these mediating variables into their research model.

The third limitation is that the service quality attributes in this study are adapted from Pham et al. (2019). However, the concept of service quality is a dynamic one and can change over time. In other words, there might be other attributes that constitute the quality of e-learning service. Future studies can identify and integrate new attributes measuring e-learning service quality into their research model.

CORRESPONDING AUTHOR:
Miguel Ángel Zúñiga, Ph.D.
Associate Professor of Marketing
Department of Business Administration
Earl G. Graves School of Business and Management
Morgan State University
Baltimore, MD 21251, USA
Phone: +1-443-885-4587
Email: Miguel.Zuniga@Morgan.edu

REFERENCES

Adedoyin, O. B., & Soykan, E. (2023). Covid-19 pandemic and online learning: the challenges and opportunities. *Interactive learning environments*, *31*(2), 863-875. https://doi.org/10.1080/10494820.2020.1813180

Agyeiwaah, E., Baiden, F. B., Gamor, E., & Hsu, F. C. (2022). Determining the attributes that influence students' online learning satisfaction during COVID-19 pandemic. *Journal of Hospitality, Leisure, Sport & Tourism Education*, *30*, 100364. https://doi.org/10.1016/j.jhlste.2021.100364

Al Issa, H. E., Omar, M. M. S., & Çelebi, A. (2023). Higher education student engagement with online learning: the role of perceived value and academic entitlement. *Higher Education, Skills and Work-Based Learning*. https://doi.org/10.1108/HESWBL-07-2023-0174

Alamri, H. (2023). Instructors' self-efficacy, perceived benefits, and challenges in transitioning to online learning. *Education and Information Technologies*, 1-36. https://link.springer.com/article/10.1007/s10639-023-11677-w

Alemayehu, L., & Chen, H. L. (2023). The influence of motivation on learning engagement: The mediating role of learning self-efficacy and self-monitoring in online learning environments. *Interactive Learning Environments*, *31*(7), 4605-4618. https://doi.org/10.1080/10494820.2021.1977962

Ali, M., Puah, C. H., Fatima, S., Hashmi, A., & Ashfaq, M. (2022). Student e-learning service quality, satisfaction, commitment and behaviour towards finance courses in COVID-19 pandemic. *International Journal of Educational Management*, *36*(6), 892-907. https://doi.org/10.1108/IJEM-04-2021-0133

Al-Samarraie, H., Teng, B. K., Alzahrani, A. I., & Alalwan, N. (2018). E-learning continuance satisfaction in higher education: a unified perspective from instructors and students. *Studies in higher education*, *43*(11), 2003-2019. https://doi.org/10.1080/03075079.2017.1298088

Armstrong, J. S., & Overton, T. S. (1977). Estimating nonresponse bias in mail surveys. *Journal of marketing research*, *14*(3), 396-402. https://doi.org/10.1177/0022243777014003

Badghish, S., Stanton, J., & Hu, J. (2018). Consumer complaint behavior: A comparison between Saudi consumers and Filipino migrants. *Journal of Consumer Satisfaction, Dissatisfaction and Complaining Behavior*, *31*, 40-66. https://www.jcsdcb.com/index.php/JCSDCB/article/view/244

Bakir, A., Bakir, N., & Blodgett, J. G. (2020). Students' Satisfaction with a Study Abroad Program. *Journal of Consumer Satisfaction, Dissatisfaction and Complaining Behavior*, *33*, 46-62. https://jcsdcb.com/index.php/JCSDCB/article/view/405

Bapat, D., & Kannadhasan, M. (2022). Satisfaction as a mediator between brand experience dimensions and word-of-mouth for digital banking services: does gender and age matter?. *Journal of Consumer Satisfaction, Dissatisfaction and Complaining Behavior*, *35*, 3-25. https://jcsdcb.com/index.php/JCSDCB/article/view/498

Bollen, K. A. (1989). *Structural equations with latent variables* (Vol. 210). John Wiley & Sons.

Bui, N., Pham, L., Williamson, S., Mohebbi, C., & Le, H. (2020). Intention to use mobile commerce: Evidence from emerging economies. *International Journal of Enterprise Information Systems (IJEIS)*, *16*(1), 1-30. https://www.google.com/books/edition/Structural_Equations_with_Latent_Variabl/4a3UDwAAQBAJ?hl=en&gbpv=0

Frechette, M., & Wingate, N. (2022). Measuring Sharing Economy Satisfaction with Star Ratings: Overall Satisfaction versus Satisfaction with the Service Provider. *Journal of Consumer Satisfaction, Dissatisfaction and Complaining Behavior*, *35*, 76-98. https://jcsdcb.com/index.php/JCSDCB/article/view/760

Goh, C., Leong, C., Kasmin, K., Hii, P., & Tan, O. (2017). Students' experiences, learning outcomes and satisfaction in e-learning. *Journal of E-learning and Knowledge Society*, *13*(2). https://www.learntechlib.org/p/188116/

Huy, L. V., Nguyen, P. T. H., Pham, L., & Berry, R. (2019). Technology readiness and satisfaction in Vietnam's luxury hotels. *International Journal of Management and Decision Making*, *18*(2), 183-208. https://doi.org/10.1504/IJMDM.2019.098648

Jiang, L., Jun, M., & Yang, Z. (2016). Customer-perceived value and loyalty: how do key service quality dimensions matter in the context of B2C e-commerce?. *Service Business*, *10*, 301-317. https://link.springer.com/article/10.1007/s11628-015-0269-y

Jois, A., Chakrabarti, S., & Pontevia, A. F. A. (2022). Exploring the impact of consumer satisfaction on the co-creation of a global knowledge brand. *Journal of Consumer Satisfaction, Dissatisfaction and Complaining Behavior*, *35*, 52-75. https://www.jcsdcb.com/index.php/JCSDCB/article/view/757

Jun, M., & Cai, S. (2001). The key determinants of internet banking service quality: a content analysis. *International journal of bank marketing*, *19*(7), 276-291. https://www.emerald.com/insight/content/doi/10.1108/02652320110409825/full/full/html

Kilburn, B., Kilburn, A., & Davis, D. (2016). Building collegiate e-loyalty: The role of perceived value in the quality-loyalty linkage in online higher education. *Contemporary Issues in Education Research*, *9*(3), 95-102. https://eric.ed.gov/?id=EJ1106895

Kuo, Y. C., Walker, A. E., Schroder, K. E., & Belland, B. R. (2014). Interaction, Internet self-efficacy, and self-regulated learning as predictors of student satisfaction in online education courses. *The internet and higher education*, *20*, 35-50. https://doi.org/10.1016/j.iheduc.2013.10.001

Larsen, V., & Wright, N. D. (2020). Aggregate consumer satisfaction: The telos of marketing. *Journal of Consumer Satisfaction, Dissatisfaction and Complaining Behavior*, *33*, 63-77. https://www.jcsdcb.com/index.php/JCSDCB/article/view/361

Lee, J. W. (2010). Online support service quality, online learning acceptance, and student satisfaction. *The internet and higher education*, *13*(4), 277-283. https://doi.org/10.1016/j.iheduc.2010.08.002

Lee, S. J., Srinivasan, S., Trail, T., Lewis, D., & Lopez, S. (2011). Examining the relationship among student perception of support, course satisfaction, and learning outcomes in online learning. *The Internet and Higher Education*, *14*(3), 158-163. https://doi.org/10.1016/j.iheduc.2011.04.001

Liu, C., & Arnett, K. P. (2000). Exploring the factors associated with Web site success in the context of electronic commerce. *Information & management*, *38*(1), 23-33. https://doi.org/10.1016/S0378-7206(00)00049-5

Malanga, A. C. M., Bernardes, R. C., Borini, F. M., Pereira, R. M., & Rossetto, D. E. (2022). Towards integrating quality in theoretical models of acceptance: An extended proposed model applied to e-learning services. *British Journal of Educational Technology*, *53*(1), 8-22. https://doi.org/10.1111/bjet.13091

Martínez-Argüelles, M. J., & Batalla-Busquets, J. M. (2016). Perceived service quality and student loyalty in an online university. *International Review of Research in Open and Distributed Learning*, *17*(4), 264-279. https://www.erudit.org/en/journals/irrodl/2016-v17-n4-irrodl05019/1066212ar/abstract/

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. https://heinonline.org/HOL/LandingPage?handle=hein.journals/intjedth10&div=9&id=&page=

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. https://doi.org/10.1016/j.compedu.2009.06.011

Paechter, M., Maier, B., & Macher, D. (2010). Students' expectations of, and experiences in e-learning: Their relation to learning achievements and course satisfaction. *Computers & education*, *54*(1), 222-229. https://doi.org/10.1016/j.compedu.2009.08.005

Parasuraman, A., & Grewal, D. (2000). The impact of technology on the quality-value-loyalty chain: a research agenda. *Journal of the academy of marketing science*, *28*(1), 168-174. https://doi.org/10.1177/0092070300281015

Parasuraman, A., Berry, L. L., & Zeithaml, V. A. (1991). Refinement and reassessment of the SERVQUAL scale. *Journal of retailing*, *67*(4), 420. https://www.proquest.com/openview/20ce41a3232b328c782d08cf26648612/1?pq-origsite=gscholar&cbl=41988

Peltier, J. W., Schibrowsky, J. A., & Drago, W. (2007). The interdependence of the factors influencing the perceived quality of the online learning experience: A causal model. *Journal of Marketing Education*, *29*(2), 140-153. https://doi.org/10.1177/02734753073020

Petersen, M. J., Wright, N. D., & Aron, D. (2020). Intense customer satisfaction while studying abroad: Study abroad as a transcendent customer experience. *Journal of Consumer Satisfaction, Dissatisfaction and Complaining Behavior*, *33*, 23-45. https://jcsdcb.com/index.php/JCSDCB/article/view/401

Pham, L., & Anh, D. N. P. (2014). Intention to use E-banking in a newly emerging country: Vietnamese customer's perspective. *International Journal of Enterprise Information Systems (IJEIS)*, *10*(2), 103-120. https://10.4018/ijeis.2014040106

Pham, L., Kim, K., Walker, B., DeNardin, T., & Le, H. (2022). Development and validation of an instrument to measure student perceived e-learning service quality. In *Research Anthology on Service Learning and Community Engagement Teaching Practices* (pp. 597-625). IGI Global. https://10.4018/978-1-6684-3877-0.ch034

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), 1-26. https://link.springer.com/article/10.1186/s41239-019-0136-3

Pham, L., Limbu, Y. B., Le, M. T. T., & Nguyen, N. L. (2023). E-government service quality, perceived value, satisfaction, and loyalty: evidence from a newly emerging country. *Journal of Public Policy*, 1-22. https://doi.org/10.1017/S0143814X23000296

Pham, L., Nguyen, P. T. H., & Luse, D. (2018). Technology readiness and customer satisfaction in luxury hotels: A case study of Vietnam. *International Journal of Entrepreneurship*, *22*(2), 1-23. https://www.proquest.com/openview/f503428d8635ef8073c13d9eb1733de8/1?pq-origsite=gscholar&cbl=29727

Pham, L., Pallares-Venegas, E., & Teich, J. E. (2012). Relationships between logo stories, storytelling complexity, and customer loyalty. *Academy of Banking Studies Journal*, *11*(1), 73. https://www.proquest.com/openview/3fc7c1b5511e821b9483810914e6d967/1?pq-origsite=gscholar&cbl=39596

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. https://10.4018/IJEIS.2018070102

Pham, L., Williamson, S., Lane, P., Limbu, Y., Nguyen, P. T. H., & Coomer, T. (2020). Technology readiness and purchase intention: role of perceived value and online satisfaction in the context of luxury hotels. *International Journal of Management and Decision Making*, *19*(1), 91-117. https://doi.org/10.1504/IJMDM.2020.104208

Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: a critical review of the literature and recommended remedies. *Journal of applied psychology*, *88*(5), 879. https://doi.org/10.1037/0021-9010.88.5.879

Powers, T. L., Jack, E. P., & Choi, S. (2018). Price and quality value influences on retail customer satisfaction and loyalty. *Journal of Consumer Satisfaction, Dissatisfaction and Complaining Behavior*, *31*, 21-39. https://jcsdcb.com/index.php/JCSDCB/article/view/252

Sailors, J. J., Rothausen, T. J., DeVaughn, M. L., & Puto, C. P. (2019). A model of full-time professional graduate student satisfaction: program design, delivery, and outcomes. *Journal of Consumer Satisfaction, Dissatisfaction and Complaining Behavior*, *32*, 67-90. https://www.jcsdcb.com/index.php/JCSDCB/article/view/292

Selim, H. M. (2007). Critical success factors for e-learning acceptance: Confirmatory factor models. *Computers & education*, *49*(2), 396-413. https://doi.org/10.1016/j.compedu.2005.09.004

Shaik, N., Lowe, S., & Pinegar, K. (2006). DL-sQUAL: A multiple-item scale for measuring service quality of online distance learning programs. *Online Journal of Distance Learning Administration*, *9*(2). https://www.efaidnbmnnnibpcajpcglclefindmkaj/https://citeseerx.ist.psu.edu/document?repid=rep1&type=pdf&doi=70ee88c3125988bcea5fa6af295def0e1548b245

Smith, K. K. (2021). Customer satisfaction and commitment: Considering relational investment and rapport in customer service interactions. *Journal of Consumer Satisfaction, Dissatisfaction and Complaining Behavior*, *34*, 164-185. https://www.jcsdcb.com/index.php/JCSDCB/article/view/380

Sohn, C. S. (2000). *Customer evaluation of Internet-based service quality and intention to re-use internet-based services*. Southern Illinois University at Carbondale. https://www.proquest.com/openview/507bdbe790e13c81d010d6fe98dcc645/1?pq-origsite=gscholar&cbl=18750&diss=y

Sun, W., Hong, J. C., Dong, Y., Huang, Y., & Fu, Q. (2023). Self-directed learning predicts online learning engagement in higher education mediated by perceived value of knowing learning goals. *The Asia-Pacific Education Researcher*, *32*(3), 307-316. https://link.springer.com/article/10.1007/s40299-022-00653-6

Taylor, S. A., & Sirmans, E. T. (2019). (Relative) Status Quo Effects on Customer Loyalty in Satisfaction and Trust Relationships in Insurance. *Journal of Consumer Satisfaction, Dissatisfaction and Complaining Behavior*, *32*, 54-66. https://jcsdcb.com/index.php/JCSDCB/article/view/323

Thinh, N. H. T., Pham, L., & Strickler, C. (2019). Customer trust and purchase intention: How do primary website service quality dimensions matter in the context of luxury hotels in Vietnam. *International Journal of E-Services and Mobile Applications (IJESMA)*, *11*(1), 1-23. https://10.4018/IJESMA.2019010101

Uppal, M. A., Ali, S., & Gulliver, S. R. (2018). Factors determining e-learning service quality. *British journal of educational technology*, *49*(3), 412-426. https://doi.org/10.1111/bjet.12552

Van, H. N., Pham, L., Williamson, S., Huong, V. T., Hoa, P. X., & Trang, P. L. H. (2020). Impact of perceived risk on mobile banking usage intentions: trust as a mediator and a moderator. *International Journal of Business and Emerging Markets*, *12*(1), 94-118. https://doi.org/10.1504/IJBEM.2020.106202

Van, Ha Nguyen, Long Pham, Stan Williamson, Ching-Yuen Chan, Tran Duc Thang, and Vu Xuan Nam. "Explaining intention to use mobile banking: Integrating perceived risk and trust into the technology acceptance model." *International Journal of Applied Decision Sciences* 14, no. 1 (2021): 55-80. https://doi.org/10.1504/IJADS.2021.112933

Veeramanickam, M. R. M., & Mohanapriya, M. (2016). Iot enabled futurus smart campus with effective e-learning: i-campus. *GSTF journal of Engineering Technology (JET)*, *3*(4), 8-87.

Wang, Y. S., Wang, H. Y., & Shee, D. Y. (2007). Measuring e-learning systems success in an organizational context: Scale development and validation. *Computers in Human Behavior*, *23*(4), 1792-1808. https://doi.org/10.1016/j.chb.2005.10.006

Weaver, D., Spratt, C., & Nair, C. S. (2008). Academic and student use of a learning management system: Implications for quality. *Australasian journal of educational technology*, *24*(1). https://doi.org/10.14742/ajet.1228

Wei, J. (2023). Are Satisfied Consumers Willing to Be Loyal? A Qualitative Study of Chinese Consumers. *Journal of Consumer Satisfaction, Dissatisfaction and Complaining Behavior*, *36*(2), 41-67. https://jcsdcb.com/index.php/JCSDCB/article/view/916

Wong, R. (2023). When no one can go to school: does online learning meet students' basic learning needs?. *Interactive learning environments*, *31*(1), 434-450. https://doi.org/10.1080/10494820.2020.1789672

Yang, Z., & Peterson, R. T. (2004). Customer perceived value, satisfaction, and loyalty: The role of switching costs. *Psychology & marketing*, *21*(10), 799-822. https://doi.org/10.1002/mar.20030

Yousaf, H. Q., Rehman, S., Ahmed, M., & Munawar, S. (2022). Investigating students' satisfaction in online learning: the role of students' interaction and engagement in universities. *Interactive Learning Environments*, 1-18. https://doi.org/10.1080/10494820.2022.2061009

Zhu, F., Lu, S., Groening, C., & Kang, J. (2023). The relationship between individual customer satisfaction and loyalty: the moderating role of firm-level signals. *Journal of Consumer Satisfaction, Dissatisfaction and Complaining Behavior*, *36*(2), 15-40. https://www.jcsdcb.com/index.php/JCSDCB/article/view/895