

THE INFLUENCE OF SERVICE QUALITY BY THE UNIVERSITY ON STUDENT LOYALTY: THE ROLE OF STUDENT SATISFACTION AS MEDIATOR

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Abstract: Higher Education Institutions (HEIs) are service providers to students, where students are considered customers of a university. However, there are still various issues involving the quality of services provided by universities. Therefore, this study was conducted to examine the influence of service quality by universities on student satisfaction and loyalty, with student satisfaction set as a mediator. This study used a quantitative approach through stratified random sampling by distributing questionnaires to 285 third-year students from the Faculty of Business, Economics, and Social Development (FPEPS) at Universiti Malaysia Terengganu. Regression analysis and the Sobel Test were used to address all the research objectives. The study's findings indicate that service quality has a significant and positive indirect effect on student loyalty, mediated by student satisfaction. Understanding and improving service quality in HEIs contributes directly to the preparation of a skilled workforce that can drive innovation and growth in the blue economy industry.

Keywords: Higher Education Institutions (HEIs), student satisfaction, student loyalty, university service quality.

Introduction

For several centuries, the aspect of service quality has begun to receive attention from various sectors worldwide. Service quality is a multidimensional concept that has been defined and studied in the fields of marketing and service management (Parasuraman *et al.*, 1988). Service quality is an aspect emphasised by service provider organisations toward their customers.

Various service sectors have utilised and applied this concept of service quality, including the public sector, banking sector, healthcare sector, and not least, the higher education sector (Pavlov & Hoy, 2018). Since then, the higher education sector has also emphasised the aspect of service quality provided to its customers.

The service delivery system is an element that exists in every organisation or individual that offers any service or assistance. The quality of a service must be maintained to ensure that customers receive good service. According to Parasuraman *et al.* (1988), service quality can be

defined as the ability of an organisation to meet or exceed customer expectations. The term satisfaction in university services refers to student satisfaction, which is a multifaceted perception involving various dimensions (Marzo-Navarro *et al.*, 2005). Additionally, the term loyalty refers to the willingness of students to provide positive evaluations of their educational institution and recommend it favorably to others (Yusof *et al.*, 2019). In the context of universities, there are various aspects of service delivery provided to students. As a result, various issues have arisen under different aspects of service quality in universities, which can influence student satisfaction and loyalty.

Furthermore, maintaining the quality of services provided by universities to their students is crucial for achieving the objectives of a service provider organisation, which is to gain student loyalty. As stated by McMullan and Gilmore (2008), customer loyalty is a crucial aspect that

must be emphasised by organisations and industries providing services. To achieve student loyalty, there are specific aspects that universities must focus on. One such aspect is student satisfaction. Student satisfaction can be achieved when the quality of services provided by the university meets students' expectations, leading to positive perceptions of the services offered. As Annamdevula and Bellamkonda (2016) highlighted, service quality is an important input for achieving student satisfaction, which in turn drives student loyalty.

In the context of universities, students have been conceptualised and regarded as customers (Calma & Deane, 2020). As a result, universities have taken various initiatives to maintain the quality of services provided to their students and to upgrade the infrastructure and facilities available. However, recently, various issues have arisen regarding the quality of services provided by universities, which can affect student satisfaction and loyalty. Among these issues is the quality of sports facilities at several public universities in Malaysia, which is considered unsatisfactory, such as insufficient facilities and facilities that are not disability-friendly (Zainal Abidin *et al.*, 2019).

Additionally, there are issues with poor internet access at Universiti Malaya (UM), Universiti Teknologi MARA (UiTM), Universiti Putra Malaysia (UPM), and Universiti Malaysia Sabah (UMS) (Hasnan, 2023). In terms of health centres, issues have also emerged regarding the quality of services at university health centres. For example, there is a lack of seating at the university health centre at Universiti Tun Hussein Onn Malaysia (UTHM), Pagoh branch (Kirin *et al.*, 2023). Thus, this indirectly leads to lower levels of student satisfaction, which negatively impacts student loyalty.

Moreover, a study by Doan (2021) reported that service quality has a positive relationship with student satisfaction and loyalty. Similarly, recent findings by Bui *et al.* (2022) also observed that high service quality by Higher Education Institutions (HEIs) in Vietnam has a positive

impact on student satisfaction and loyalty, with satisfaction acting as an indirect factor. Therefore, this study is conducted to identify the influence of service quality by universities on student satisfaction and loyalty, using student satisfaction as a mediating factor. In this study, the researcher aims to address the research gap related to the geographical focus of previous studies, as most studies on this topic have been conducted in Western contexts, with earlier researchers paying less attention to the educational culture in Eastern regions.

Social Exchange Theory

The theory used in this study is the Social Exchange Theory (Homans, 1961). This theory emphasises that individuals tend to respond positively to positive actions, and the same applies to negative actions (Homans, 1961). In the context of higher education, the same concept applies, where if the quality of services provided by a university to its students is good, then student satisfaction and loyalty will also be good and achievable. As in the study conducted by Ndaaba *et al.* (2018), they explored the application of Social Exchange Theory in HEIs and revealed that university management needs to enhance social interaction and relationships between the university and students to achieve student loyalty.

Notably, in this study, this theory is used to predict the relationship between the quality of services provided and student loyalty. The variable of service quality has been set as the input, while student loyalty and satisfaction act as the response or output resulting from the input received. Furthermore, the application of Social Exchange Theory in this study will establish a positive relationship, consistent with previous studies, where when someone performs a good deed, the recipient of that good deed will also respond positively.

Service Quality

Service quality is a multidimensional concept that has been defined and studied in the fields of marketing and service management (Parasuraman *et al.*, 1988). Initially, it focused only on the

marketing and service sectors. However, at present, universities are considered part of the service sector, and students are regarded as customers of a university (Olukundun *et al.*, 2019). As service providers, universities must meet the needs of their students in all aspects of the services provided to ensure high levels of student satisfaction. As suggested by Sureshchandran *et al.* (2002) in their study examining the relationship between service quality and customer satisfaction, a quantitative study was conducted on customers using banking services. The findings indicated that service providers must continuously improve and deliver high-quality service to customers to maintain high levels of customer satisfaction. Likewise, this concept is also applied in the higher education sector, as HEIs are part of the service sector. The most well-known service quality model is SERVQUAL (Parasuraman *et al.*, 1988), which has been used in the higher education sector (Galeeva, 2016).

Notably, there are various types of services offered, and based on the SERVQUAL model by Parasuraman *et al.* (1988), there are five aspects contained in service delivery: Tangibles, Reliability, Responsiveness, Assurance, and Empathy. For the Tangibles aspect, it refers to physical facilities, equipment, and the appearance of staff. Conversely, for the Reliability aspect, it refers to the ability to perform the promised service dependably and accurately. Subsequently, for the Responsiveness aspect, it refers to the willingness to help customers and provide prompt service.

Additionally, for the assurance aspect, it emphasises the knowledge and courtesy of employees and their ability to inspire trust and confidence in customers. The final aspect, empathy, refers to the caring and individualised attention provided by a service organisation to its customers (Parasuraman, Zeithaml, & Berry, 1988). The existence of these various aspects in the service delivery system has led to differences in the level of service quality across different aspects.

Various past studies have been conducted to examine different types of service quality provided by universities, including a study by D. Napitupulu *et al.* (2018) that investigated students' perceptions and expectations of the facilities provided by universities. They conducted a quantitative study on students at XYZ University and revealed that, overall, students' perceptions of the existing service quality at the university did not meet their expectations, with three facilities being the most unsatisfactory: Laboratory facilities, computer facilities, and broadband networks. According to a study by Mohamed Elias *et al.* (2021), which examined the satisfaction index of students regarding bus services at Universiti Utara Malaysia (UUM), the researchers conducted a quantitative study on UUM students. They identified that overall student satisfaction with the bus services at UUM was unsatisfactory in several key areas, including time management and reliability.

Additionally, Yidana *et al.* (2023) conducted a study by distributing questionnaires to students from two public universities in Ghana to examine whether the service quality provided by universities meets students' expectations. Consequently, the findings revealed that students' expectations and desired services from universities were higher than what they received. In the context of higher education, service quality must be well-maintained as it plays a crucial role for both students and the university itself. Similarly, Nazarian *et al.* (2012) reviewed previous studies on the role of service quality in universities, revealing that universities must provide good service quality to maintain their image and remain competitive in today's environment by meeting students' expectations.

The Influence of Service Quality on Student Loyalty

Student loyalty refers to the loyalty of a student toward their university after their learning experience at that university (Helgesen & Nasset, 2007). According to a quantitative study conducted by Thomas (2011) to validate a

structural model linking satisfaction, reputation, and loyalty among students, it was reported that student loyalty is a crucial aspect and a goal for any HEI. This statement is supported by Doan (2021), who conducted a quantitative study to examine the relationship between service quality and student loyalty. He revealed that service quality has a direct relationship with student loyalty.

Additionally, according to a study by Permana *et al.* (2020), which examined the factors of service quality and their relationship with student loyalty, the researchers highlighted that there is a positive relationship between service quality and student loyalty. This study is supported by Subandi and Hamid (2021), who conducted a quantitative study on students at the Yogyakarta Administration Academy to examine the effect of service quality on student loyalty. They reported that service quality has a positive relationship with student loyalty, and student loyalty has both short-term and long-term impacts on the educational institution.

In addition, a study conducted by Bakrie *et al.* (2019) on students at Palembang University examined the relationship between service quality and student loyalty. Their study demonstrated that the relationship between the two variables was not significant, indicating that student loyalty is influenced by other factors. Similarly, this finding is supported by a study by Chandra *et al.* (2019), where they conducted a quantitative study to examine the influence of service quality and university image on student satisfaction and loyalty. They revealed that student loyalty cannot be achieved solely through the service quality provided. However, to achieve student loyalty, student satisfaction with the service quality provided must be present. Therefore, the following hypothesis has been established:

H1: There is a positive relationship between service quality and student loyalty.

The Influence of Service Quality on Student Satisfaction

Student satisfaction refers to students' satisfaction with their overall educational experience, which encompasses various factors such as teaching quality, academic resources, administrative services, campus facilities, and social and cultural environments (Elliot & Healy, 2001). Notably, good service quality leads to high satisfaction, which in turn results in long-term benefits (Anderson *et al.*, 1994). Many past studies have examined the relationship between service quality and student satisfaction. Among them is a study conducted by Chandra *et al.* (2018), which carried out a quantitative study to investigate the factors influencing service quality on student satisfaction and loyalty. A total of 1,000 students from 13 universities were surveyed. The study reported a positive relationship between service quality and student satisfaction. Hence, this means that student satisfaction can be enhanced when service quality improves.

Additionally, a study by Suyanto *et al.* (2019) examined the effect of service quality on student satisfaction at Gorontalo University. They distributed questionnaires to students at the university and revealed that there is a positive influence between the service quality provided and student satisfaction. This finding suggests that improving the quality of services provided by the university can enhance student satisfaction. Moreover, these findings are supported by Twum and Peprah (2020), who surveyed to assess student satisfaction with the services provided at Valley View University. They indicated that all five dimensions of service quality, based on the SERVQUAL model, have a positive and strong relationship with student satisfaction. This suggests a relationship between service quality and student satisfaction. Therefore, this study establishes the following hypothesis:

H2: There is a positive relationship between service quality and student satisfaction.

The Influence of Student Satisfaction on Student Loyalty

Student satisfaction is an aspect that can influence the level of student loyalty. Many studies have

examined the relationship between satisfaction and student loyalty. Al-erqi *et al.* (2020) conducted a quantitative study on international students at UTHM to identify the factors influencing their satisfaction and loyalty toward UTHM. The findings revealed that student satisfaction has a significant relationship with student loyalty. This is supported by Addai *et al.* (2023), who conducted a deductive study on students at Ghana Communication Technology University (GCTU) to examine the influence of student satisfaction with learning sessions on student loyalty. They revealed that an increase in student satisfaction leads to greater student loyalty.

Additionally, a study conducted in Cambodia by Kieng *et al.* (2021) involved a quantitative study on undergraduate students from three private universities to examine the factors influencing student satisfaction and loyalty in private universities. The study also reported that student satisfaction influences student loyalty. Positive experiences and enjoyment during their time at the university can encourage students to continue their studies at that institution.

Furthermore, these findings are also supported by a study by Ali *et al.* (2021), who conducted a quantitative study to explain the cause-and-effect relationship between the main determinants of student loyalty and its connection to student loyalty. The study demonstrated that student satisfaction has a positive relationship with student loyalty and established that student satisfaction is the most important and frequently used aspect in achieving student loyalty. On the other hand, a study by Mesta (2019), which examined the effect of student satisfaction on student loyalty, also revealed that student satisfaction with university services has a significant relationship with student loyalty. This means that the higher the student satisfaction, the greater the student loyalty toward the university. Therefore, the following hypothesis has been established in this study:

H3: There is a positive relationship between student satisfaction and student loyalty.

The Role of Student Satisfaction as a Mediator in the Relationship Between Service Quality and Student Loyalty

Customer satisfaction is an important aspect for the service sector, including HEIs, and it is a priority for universities. Many past studies have examined the role of student satisfaction as a mediator in the relationship between service quality and student loyalty. Among them is a study conducted by Borishade *et al.* (2021), which investigated the effect of student satisfaction as a mediator in the relationship between service quality and student loyalty. They conducted a quantitative study on students from the top private university in Nigeria and revealed that when students are satisfied with the services provided, student loyalty is achieved.

Furthermore, this statement is supported by a study by Mbango and Ngibeni (2022), who conducted a quantitative study on Open Distance Electronic Learning (ODEL) students to examine the factors influencing student satisfaction and loyalty. They revealed that the role of satisfaction as a mediator is significant in the relationship between service quality and student loyalty. Service quality is an aspect that must be prioritised to enhance the level of student loyalty.

In addition, a study conducted by Hassan *et al.* (2019) examined the mediating role of corporate image and student satisfaction in the relationship between service quality and loyalty among Technical Vocational Education and Training (TVET) students. The study demonstrated that the role of student satisfaction as a mediator in the relationship between service quality and student loyalty exists. Moreover, it also stated that a good relationship between staff and students leads to student satisfaction, which in turn influences student loyalty. These findings are also supported by Ahmad *et al.* (2021), who conducted a quantitative study on students from private universities in the Klang Valley to propose the use of a mediation model linking university

entities and student loyalty through student satisfaction. In the study, the researchers identified that student satisfaction is indeed suitable as a mediator in the relationship between university entities, such as academic facilities and support systems, with student loyalty, where the relationship between these variables is positive. Therefore, this study establishes the following hypothesis:

H4: There is a positive relationship between the level of satisfaction and student loyalty through student satisfaction.

Conceptual Framework and Hypotheses

Figure 1 below represents the conceptual framework used in this study. According to the conceptual framework, this study has established service quality as the independent variable, encompassing several aspects, including the skills and knowledge of university staff, the teaching quality of university lecturers, and access to the provided infrastructure. Additionally, student

loyalty is set as the dependent variable, with the aspects emphasised under this variable consisting of the desire to maintain contact with the university faculty, the intention to pursue higher education at the same university, and the students' perspective on whether they would recommend the university to others.

For student satisfaction, the researcher has established it as a mediator in the relationship between service quality and student loyalty. The researcher has identified several aspects under this variable, including satisfaction with the quality of university facilities, the choice of the right university, meeting student expectations, and the learning experience. Furthermore, based on this conceptual framework, it can be seen that there are four hypotheses established in this study. Therefore, the objective of this study is to examine the relationship between service quality and student loyalty, as well as the role of student satisfaction as a mediator in this relationship. Below are the study hypotheses:

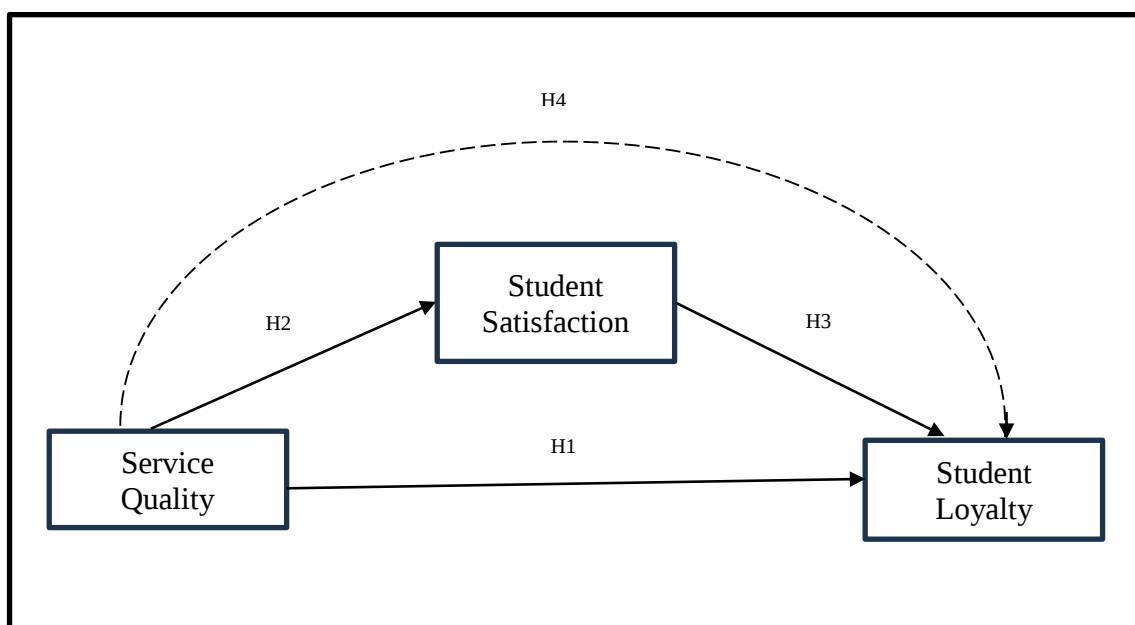


Figure 1: Conceptual framework of the study

Materials and Methods

This chapter discussed the research methodology, where the researcher will explain in greater detail the various aspects used in this study. Among the aspects covered in this section are the research

approach, data collection methods, research instruments, sampling process, study sample population, and data analysis techniques used in this study.

Research Design

In this study, the researcher uses a quantitative approach to examine the quality of services provided by the university to students, which requires a large number of respondents. This makes it easier for the researcher to collect and analyse a large number of questionnaires using statistical calculation methods. Moreover, the study employs a cross-sectional strategy, where data collection is conducted only once, as the research objectives do not require multiple rounds of data collection.

Research Instrument

The research instrument used in this study is a questionnaire adapted from previous researchers. The questionnaire consists of four sections: Section A, which covers respondent demographics; Section B, which includes questions related to service quality provided by the university; Section C, which contains questions related to student satisfaction; and Section D, which includes questions covering student loyalty.

Sampling Process

In this study, the researcher uses probability sampling because the research does not require specific respondents. The sampling technique used under probability sampling is stratified random sampling, where the researcher obtains an appropriate number of respondents according to the number of students in each of the six programs under the Faculty of Business, Economics, and Social Development (FPEPS). Notably, stratified sampling was chosen for this study to ensure fair data collection from students in each programme, and this method allows the selected data to be accurate and reliable.

Population and Sample of the Study

The population in this study consists of third-year students from each programme under the FPEPS,

totalling 760 students. Based on Raosoft software (2004), the required sample size is 256 respondents. This number was then calculated using the stratified random sampling formula to ensure that the data collected is proportionate to the number of students in each program.

After calculating, the required sample size for this study is 257 respondents, consisting of 44 respondents from the Bachelor of Economics (Natural Resources), 26 respondents from the Bachelor of Counseling, 48 respondents from the Bachelor of Management (Marketing), 46 respondents from the Bachelor of Management (Policy Studies), 34 respondents from the Bachelor of Tourism, and finally, 59 respondents from the Bachelor of Accounting. Following the study, the researcher successfully obtained a total of 285 respondents, exceeding the required amount. According to Chittaranjan (2020), a sample size larger than required is better for representing a population in a study, as long as it is not excessive. This indicates that the number of respondents in this study is good because it exceeds the required number by 28 respondents.

Results and Discussion

Reliability Test

Before conducting the full study, the researcher performed a reliability test on the questionnaire items used in this study to determine the reliability level of the questions to be asked of the respondents. This test was also conducted to ensure that the data obtained are consistent and reliable. The results of the reliability analysis can be seen in the table below, which demonstrates that all dimensions achieved Cronbach's alpha values exceeding 0.800, indicating that all the questions used are reliable.

Table 1: Reliability test

Dimensions and Items	Cronbach's Alpha
Service Quality	0.877
(1) Lecturers treat all students equally	
(2) Lecturers follow good teaching techniques	
(3) Course content expands students' knowledge	
(4) Lecturers are responsive and approachable	
(5) Administrative staff are polite and ready to assist	
(6) Administration maintains accurate and accessible records	
(7) Lecture rooms are clean and comfortable	
(8) Science/computer labs are equipped with complete facilities	
(9) The library has sufficient academic resources	
(10) The university provides counselling services	
(11) The campus environment is comfortable and conducive to learning	
(12) The university is safe and has safety guidelines	
Student Satisfaction	0.897
(1) I am satisfied with my decision to study here	
(2) I am satisfied with the quality of academic services	
(3) I feel comfortable studying here	
(4) I am satisfied with the quality of the lecturers	
(5) I am satisfied with the quality of administrative services	
(6) I am satisfied with the quality of equipment and facilities provided	
Student Loyalty	0.875
(1) The university has made a positive impact on me	
(2) I will recommend this university to friends and family	
(3) I feel proud when participating in university activities	
(4) I will write positive reviews about this campus on social media	
(5) I do not intend to transfer to another campus	

Structural Model

Based on Table 2, Hypothesis 1 suggests that there is a positive relationship between service quality and student loyalty. The analysis demonstrated that there is a positive effect between service quality and student loyalty, where $\beta = 0.394$, $p < 0.001$, indicating that Hypothesis 1 is accepted.

Subsequently, Hypothesis 2 suggests that there is a positive relationship between service quality and student satisfaction. The analysis revealed that there is a positive effect between service quality and student satisfaction, where $\beta = 0.957$, $p < 0.001$, indicating that Hypothesis 2 is accepted.

Furthermore, Hypothesis 3 suggests that there is a positive relationship between student

satisfaction and student loyalty. The data analysis identified that there is a positive effect between student satisfaction and student loyalty, where $\beta = 0.702$, $p < 0.001$, indicating that Hypothesis 3 is accepted.

Lastly, Hypothesis 4 determines that there is a positive relationship between the level of satisfaction and student loyalty through the indirect relationship of student satisfaction as a mediator. The data analysis reported that student satisfaction plays a significant and positive role as a mediator in the relationship between service quality and student loyalty, where $Z = 9.47$, $p < 0.001$, indicating that Hypothesis 4 is accepted.

Table 2: Hypothesis testing

Hypothesis	Relationship Between Variables	β	SE	P-Value	Results
H1	Service Quality $\rightarrow$ Student Loyalty	0.394	0.079	0.000***	Accepted
H2	Service Quality $\rightarrow$ Student Satisfaction	0.957	0.037	0.000***	Accepted
H3	Student Satisfaction $\rightarrow$ Student Loyalty	0.702	0.069	0.000***	Accepted
Hypothesis	Relationship Between Variables	Z	SE	P-Value	Results
H4	Service Quality $\rightarrow$ Student Satisfaction $\rightarrow$ Student Loyalty	9.47	0.071	0.000***	Accepted

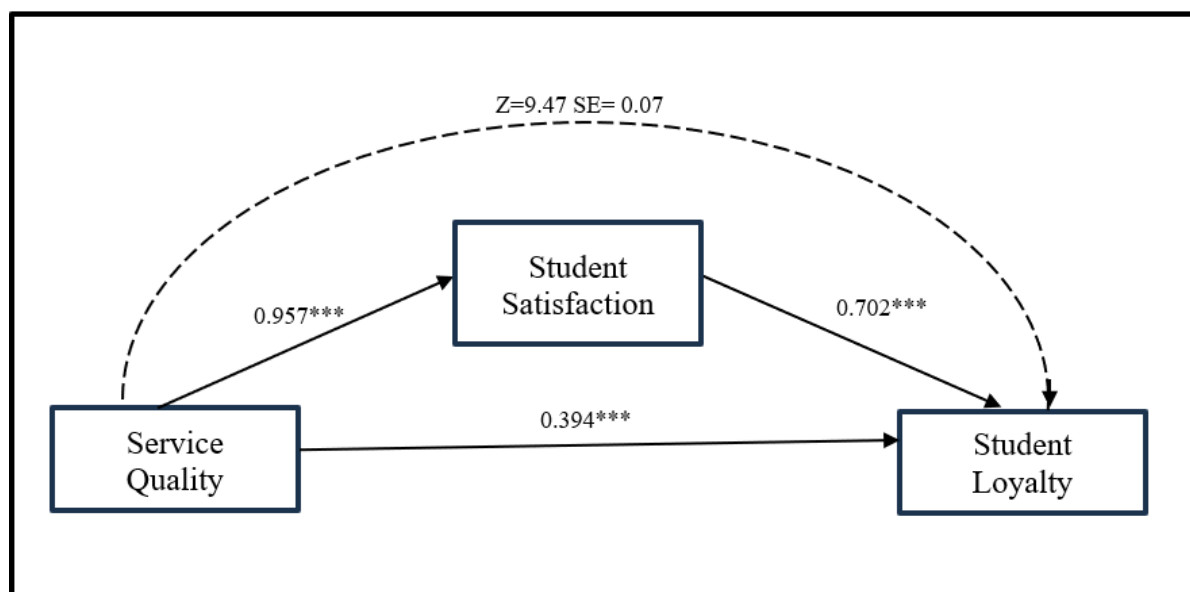


Figure 2: Conceptual framework of the study findings

Discussion

The main objective of this study is to examine the influence of service quality provided by the university on student satisfaction and loyalty, as well as the role of student satisfaction as a mediator. This study focuses on three aspects: Service quality provided by the university, student satisfaction, and student loyalty. Based on the research conducted, the researcher identified that all aspects studied are significant, and the researcher has successfully expanded the literature and knowledge related to the research topic.

In general, based on the study's analysis, service quality influences student loyalty, and the researcher revealed a significant relationship between these two variables. When the quality of

services provided by the university to its students is high, it can lead to increased student loyalty toward the university because all aspects of the services required by students are well-maintained. Students' expectations of their university are also met. As a result, students will uphold the reputation of their university and consistently speak positively about it, which reflects a high level of student loyalty toward their university. Moreover, the discussion of these findings is supported by previous studies (Permana *et al.*, 2020; Hamid, 2021), which indicate a relationship between satisfaction and student loyalty. The loyalty derived from service quality can have both long-term and short-term impacts on the educational institution attended.

Furthermore, regarding the results of the analysis of the influence of service quality on student satisfaction, the data analysis also demonstrates a significant relationship. This proves that the quality of services provided by the university greatly influences student satisfaction. When the quality of services provided by a university meets and fulfils the needs of its students, it directly increases student satisfaction because these services can help students resolve or simplify their tasks. Hence, it can be emphasised that the higher the quality of services provided by a university, the higher the level of satisfaction a student has with their university. These findings are supported by previous studies (Suyanto *et al.*, 2019; Twum & Peprah, 2020), which reported a positive relationship between service quality and student satisfaction. Additionally, aspects of service quality, such as Tangibles, Reliability, Responsiveness, Assurance, and Empathy, were discovered to significantly influence student satisfaction.

The analysis of the influence of student satisfaction on student loyalty reveals a significant relationship between student satisfaction and student loyalty. This proves that there is a positive relationship between these two variables. When student satisfaction is high, it directly influences and increases student loyalty. A high level of satisfaction will encourage students to recommend their university to others based on their positive experiences. Similarly, these findings are supported by studies (Kieng *et al.*, 2021; Ali *et al.*, 2021), which reveal that student satisfaction can influence student loyalty, as positive experiences gained during their university tenure can encourage them to pursue higher levels of education.

Finally, the analysis of the influence of service quality on student loyalty, with student satisfaction as a mediator, reveals a significant indirect relationship between service quality and student loyalty. This suggests the existence of an indirect relationship, also known as an indirect effect, between service quality and student loyalty, mediated by student satisfaction. Therefore, this means that the quality of services

provided by the university to its students influences student satisfaction. At the same time, the level of student satisfaction also influences student loyalty toward the university they attend. These findings are supported by Hassan *et al.* (2019) and Ahmad *et al.* (2021), who revealed that the role of student satisfaction as a mediator in the relationship between service quality and student loyalty indeed exists. The study highlighted that a positive relationship between university staff and students enhances student satisfaction and, indirectly, increases student loyalty.

Conclusions

In conclusion, this study was conducted to identify the influence of service quality provided by the university on student satisfaction and loyalty, with student satisfaction as a mediating factor. The study's results revealed a significant relationship between service quality and student satisfaction and loyalty, as well as the mediating role of student satisfaction in this relationship.

The findings of this study can be used to periodically assess students' perceptions to improve quality, particularly in terms of student satisfaction and loyalty. Additionally, this study is also important for HEIs to produce quality students and enhance the image of a university, while also contributing to the development of a skilled workforce for the country.

However, this study has its limitations as it focuses solely on students from a single faculty. Therefore, the results of this study are not suitable for generalisation to all faculties at Universiti Malaysia Terengganu or other HEIs in Malaysia. In the future, emphasis should be placed on studies related to service quality and satisfaction that align with the Industrial Revolution 4.0 (IR 4.0) by proposing the use of technology to enhance higher education services. Institutions can leverage IR 4.0 technologies, such as empowering online learning platforms, data analytics, and Artificial Intelligence (AI) driven feedback systems to improve service quality,

contributing to a more effective and efficient educational experience for students.

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Conflict of Interest Statement

The authors agree that this research was conducted in the absence of any self-benefits, commercial or financial conflicts, and declare the absence of conflicting interests with the funders.

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