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Evaluating Public University Service Quality and its Influence on Student Satisfaction and Loyalty: The Disjoint Two-Stage Approach

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ABSTRAK

Meningkatnya persaingan antar universitas telah menyebabkan universitas negeri untuk mengembangkan daya saing internal, termasuk loyalitas mahasiswa sebagai asset strategis. Namun, penelitian sebelumnya menunjukkan adanya inkonsistensi pada hasil dan masih jarang yang menerapkan higher-order construct untuk mengurai kualitas layanan universitas negeri. Penelitian ini mengevaluasi kualitas layanan universitas dan pengaruhnya terhadap loyalitas mahasiswa dengan menyoroti peran kepuasan mahasiswa sebagai mediasi. Penelitian ini dilakukan di Fakultas Teknik, Universitas Negeri Jakarta. Teknik analisis data menggunakan PLS-SEM dengan pendekatan disjoint two-stage, yang lebih akurat dalam menangani higher-order construct pada kualitas layanan. Temuan penelitian ini adalah kualitas layanan universitas negeri dan kepuasan mahasiswa mempengaruhi loyalitas mahasiswa secara positif dan signifikan. Kualitas layanan universitas negeri juga mempengaruhi kepuasan mahasiswa secara positif dan signifikan. Selain itu, kepuasan mahasiswa berperan sebagai mediasi parsial antara kualitas layanan dan loyalitas mahasiswa. Temuan ini menggarisbawahi secara teoritis dan praktis bahwa universitas negeri harus memprioritaskan inisiatif-inisiatif yang meningkatkan dimensi layanan yang berdampak pada kepuasan dan loyalitas mahasiswa, seperti pengembangan keterampilan mahasiswa. Dengan mengintegrasikan higher-order construct pada kualitas layanan, penelitian ini berkontribusi pada kerangka metodologi dan wawasan yang dapat ditindaklanjuti bagi administrator yang berupaya mengoptimalkan manajemen mutu di universitas negeri.

ABSTRACT

The growing competition between universities has led public universities to develop internal competitiveness, including student loyalty as a strategic asset. However, previous studies have shown inconsistencies in the results and have seldom applied higher-order constructs to analyze the public university service quality. This study evaluates university service quality and its impact on student loyalty, emphasizing the mediating role of student satisfaction. This study was conducted at the Faculty of Engineering, Universitas Negeri Jakarta. The data analysis technique employed PLS-SEM with the disjoint two-stage approach, which is more accurate in handling higher-order constructs on service quality. The findings indicate that public university service quality and student satisfaction influence student loyalty positively and significantly. Public university service quality also influences student satisfaction positively and significantly. Additionally, student satisfaction acts as a partial mediation between service quality and student loyalty. These findings underscore theoretically and practically that public universities should prioritize initiatives that improve service dimensions that impact student satisfaction and loyalty, such as students' skill development. By integrating higher-order constructs for service quality, this study contributes to a methodological framework and actionable insights for administrators to optimize quality management in public universities.

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INTRODUCTION

Universities face numerous challenges in maintaining competitiveness in a rapidly changing environment driven by globalization, demographic shifts, and rising student expectations (Hart & Rodgers, 2023; Iftikhar et al., 2020). In the context of public universities in Indonesia, competition has also occurred since the change in the universities' governance to State Universities with Legal Entities (PTN-BH). Moreover, Susanti (2011) explained that the increase in tuition at PTN-BH has created a perception that it is more expensive than most of private universities in Indonesia. The tuition increase shows the existence of tight competition between public and private universities in terms of tuition (Rachmadhani et al., 2018). Various internal and external forces drive this elevated competition, necessitating universities to undergo dynamic transformations to sustain their relevance (Iftikhar et al., 2020; Jošanov-Vrgović et al., 2020). To enhance competitiveness, universities must develop their internal sources of competition, including students, as strategic assets (Naidoo, 2018). Hart & Rodgers (2023) explained that long-term competitive advantages can be obtained through student loyalty to minimize the risk of choosing alternative universities. Consequently, fostering student loyalty emerges as a vital strategy for universities aiming to maintain and enhance their competitive position.

Service quality is a key competitive advantages in attracting and retaining students (Naidoo, 2018), but its relationship with student loyalty remains inconsistent. For instance, studies in Indonesia public and private universities in Riau by Chandra et al. (2019) and a private university in Bali by Kusyana et al. (2020) found no significant relationship between service quality and student loyalty, contrasting with positive and significant relationship reported in other studies by Annamdevula & Bellamkonda (2016), Mutum et al. (2023), Supriyanto et al. (2024), Windasari et al. (2021). This discrepancy may stem from contextual nuances, which, in private universities, students often prioritize self-satisfaction over transactional service quality. This behavior also occurs in the public universities and suggest that satisfaction is a prerequisite for loyalty rather than a direct outcome of service quality. This study addresses the gap by applying the Public Service-Dominant Approach by Osborne et al. (2013), framing students as active co-creators of value, to investigate whether student satisfaction mediates between service quality and student loyalty in a public university context.

The study was conducted at the Faculty of Engineering, Universitas Negeri Jakarta, a public university in Jakarta that changed its governance into PTN-BH. This location was selected due to its potential for substantial competitive advantages, yet it faces challenges with student loyalty, which hinder university growth. As a public university located in the capital city of Jakarta, offering relatively lower tuition fees than private universities like Universitas Bina Nusantara and Universitas Trisakti. Among the four public universities in Jakarta, UNJ ranks third. Due to increased tuition fees and changes in governance, this position is seen negatively. The Faculty of Engineering is the most prominent in the number of study programs at UNJ. However, data shows that only 5.32% of graduates return to UNJ for further studies, indicating a low retention rate. Additionally, it is difficult for the faculty to recruit more alumni as guest lecturers, with only 26% of alumni available. These factors suggest potential issues with student loyalty, which are further reflected in alumni contribution and rechoosing the university.

This study aims to investigate (1) how public university service quality influences student loyalty and (2) the mediating role of student satisfaction in this relationship. To achieve this, we adopt the HEISQUAL framework developed by Abbas (2020). This holistic student-centric framework that assesses seven dimensions of university service quality: teachers' profile, curriculum, infrastructure and facilities, management and supporting staff, employment quality, safety and

security, and students' skill development. While HEISQUAL has been applied to Indonesian public universities in the study by Supriyanto et al. (2024), prior study omitted critical dimensions (e.g., employment quality) and treated service quality as a lower-order construct, potentially underestimating its complexity. To address this limitation, we employ PLS-SEM with a disjoint two-stage approach, which rigorously accounts for higher-order construct (e.g., service quality as a higher-order construct with seven dimensions) and reduces bias caused by measurement error (Hair et al., 2022; Sarstedt et al., 2019). By integrating the HEISQUAL framework and advanced mediation analysis, our findings provide actionable strategies to align service quality with student satisfaction, which later turns into student loyalty.

Literature Review

Public Service-Dominant Approach

A key perspective in public service management, the Public Service-Dominant Approach, emphasizes knowledge transformation and user involvement in the design and delivery of public services (Osborne et al., 2013). This approach was developed by Osborne et al. (2013) and was suggested as a solution to the shortcomings of New Public Management by utilizing Service Dominant Logic by Vargo & Lusch (2004). In the university context, students are not just passive recipients of services; they actively contribute to value co-creation by engaging in service improvement processes and promoting their universities when satisfied. The relationships between students and universities create sustainable competitive advantages through enhanced student loyalty, reinforcing the importance of service quality in the university (Hart & Rodgers, 2023). Therefore, student loyalty becomes a valuable asset for universities, contributing to the competitive advantage by ensuring the services provided are align with student needs and expectations.

Public University Service Quality

From the public service-dominant approach perspective, service quality in public universities positions students as active co-creators of value rather than passive recipients of services (Osborne et al., 2013). One way to measure and investigate the quality of services is by asking students for feedback and their perceptions about the services provided (Mattah et al., 2018). This theoretical lens reframes service quality as a dynamic, relational construct shaped by students' continuous interactions with university resources and processes. Based on that, service quality has been defined as the degree to which universities fulfill student expectations across academic, operational, and developmental dimensions (El Ahmad & Kawtharani, 2021; Jain et al., 2011). Crucially, this assessment reflects the outcomes of service delivery and the processes by which services are designed and implemented (La Rotta et al., 2020).

To operationalize this concept, researchers have developed instruments such as SERVQUAL and HEdPERF, which have been widely used. However, these instruments have limitations. SERVQUAL though widely applied, might fail to capture the unique academic and developmental priorities of the university. HEdPERF, though, captures the unique academic characteristics of universities and focuses more on universities' performance than service quality. HEISQUAL, which was developed by Abbas (2020), address these gaps through a holistic, student-centric framework that evaluates seven dimensions: teachers' profile, curriculum, infrastructure and facilities, management and supporting staff, employment quality, safety and security, and students' skill development. Unlike prior instruments, HEISQUAL integrates both technical and operational quality, reflecting the full spectrum of student experiences. Prior applications of HEISQUAL in Indonesia have

been incomplete. A study by Supriyanto et al. (2024) did not include the employment quality dimensions and treated service quality as a lower-order construct, obscuring its multidimensional nature.

Student Loyalty

Student loyalty is defined by Hennig-Thurau et al. (2001) as the intention or commitment of a student to promote, rechoose, and contribute to the university. According to Galindo-Illanes et al. (2021), student loyalty is a long-term relationship involving several cause-and-effect linkages between universities and their students to determine and meet their needs. This long-term relationship is formed due to the loyalty that is formed due to satisfaction with the service quality (Oliver, 1999). Depending on the degree of fulfillment, this recurring satisfaction will create varying degrees of loyalty. According to the degree of loyalty phase and length of study (for instance, undergraduate students), cognitive loyalty is formed in the first year of study, affective loyalty in the second year, conative loyalty in the third and fourth, and action loyalty after graduation. Universities place an immense value on student loyalty because loyal students will continue contributing to their institution after graduation (Alwi et al., 2019; Yang & Mutum, 2015). Therefore, concentrating on university student loyalty greatly helps its management build programs and improve service quality to maintain long-term relationships with current students and alumni.

Student Satisfaction

According to Sultan & Yin Wong (2012), student satisfaction was a pleasant psychological state brought on by assessing service quality in the university context. Students are satisfied when their educational experiences meet or exceed their expectations, according to Al-Sheeb et al. (2018), who described student satisfaction as a mental state generated from the appraisal of their educational experiences. Furthermore, according to Wong & Chapman (2023), when students' expectations regarding the services they receive from university are fulfilled, they experience a state known as student satisfaction. Thus, it may be said that when students obtain services that meet or above their expectations, they experience a psychological or mental state known as student satisfaction.

Incorporating the loyalty theory by Oliver (2010), loyalty is formed and deepened due to cumulative satisfaction. Cumulative satisfaction, as used in university, is the word used to describe the long-term overall satisfaction that arises from repeated interactions between students and universities (Souad & Sanséau, 2019). The level of satisfaction will increase over time as the institution meets or surpasses the expectations of the students. Repeated positive experiences will increase student satisfaction, which will encourage students to develop deeper levels of loyalty. After graduating, this loyalty will progress from cognitive to conative into action. Therefore, student satisfaction with service quality leads to the growth of student loyalty.

Conceptual and Hypotheses Framework

This study's conceptual and hypotheses framework is compiled based on theoretical and empirical studies. The conceptual framework aims to make the study more systematic. The conceptual and hypotheses model can be seen in Figure 1 to better visualize it.

Several studies have identified the influence of service quality on student loyalty. Previous studies by Annamdevula & Bellamkonda (2016), Mutum et al. (2023), Supriyanto et al.

(2024), and Windasari et al. (2021) revealed that service quality has a positive influence on student loyalty. However, the studies from Chandra et al. (2019) and Kusyana et al. (2020) revealed the opposite results. Therefore, our first hypothesis (H1) is "Public university service quality has a significantly positive influence on student loyalty."

Several studies have identified the influence of service quality on student satisfaction. Previous studies by Annamdevula & Bellamkonda (2016), Chandra et al. (2019), Kusyana et al. (2020), Mutum et al. (2023), Supriyanto et al. (2024), and Windasari et al. (2021) revealed that service quality has a positive influence on student satisfaction. However, the study by Hussein & Kamil (2022) revealed the opposite result. Therefore, our second hypothesis (H2) is "Public university service quality has a significantly positive influence on student satisfaction."

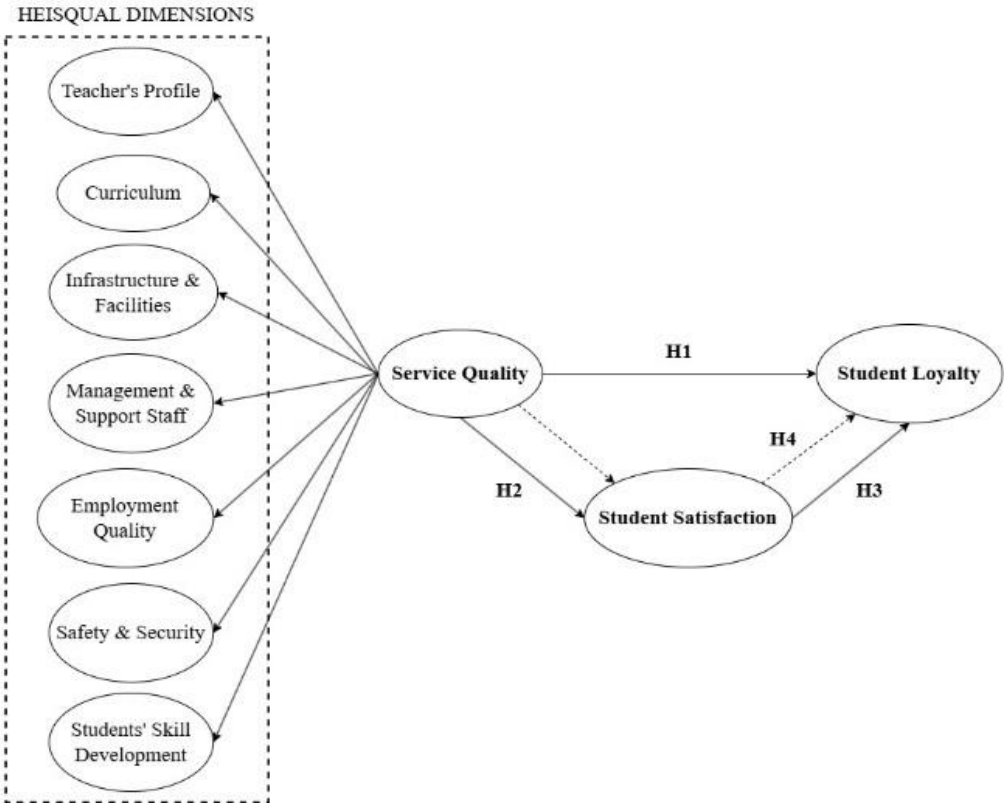
Several studies have identified the influence on student satisfaction of student loyalty. Previous studies by Annamdevula & Bellamkonda (2016), Chandra et al. (2019), Kusyana et al. (2020), Mutum et al. (2023), Supriyanto et al. (2024), and Windasari et al. (2021) revealed that student satisfaction has a positive influence on student satisfaction. However, the study from Võ (2021) revealed the opposite result. Therefore, our third hypothesis (H3) is "Student satisfaction has a significantly positive influence on student loyalty."

Several studies have been conducted to identify the mediating role of student satisfaction on service quality and student loyalty. Previous studies by Annamdevula & Bellamkonda (2016), Kusyana et al. (2020), Mutum et al. (2023), and Supriyanto et al. (2024) revealed that student satisfaction act as mediation on service quality and student loyalty. Therefore, our fourth hypothesis (H4) is "Student satisfaction mediating the relationship of public university service quality and student loyalty."

These inconsistent results could happen due to the different contexts of public and private universities and the location of study, whose students might have different behaviors. Different models proposed by other researchers could also affect the study's results, such as not considering mediating role of student satisfaction in their model.

This study makes several contributions to existing literature. First, it addresses inconsistencies in prior studies by offering empirical insights into the relationship between service quality and student loyalty, service quality and student satisfaction, and student satisfaction and student loyalty. Second, it underscores the mediating role of student satisfaction, offering a more comprehensive understanding of how service quality affects loyalty. Third, it advances the methodological application of the disjoint two-stage approach in PLS-SEM, enhancing analytical rigor in university management studies. Fourth, this study employs the HEISQUAL instrument, which has been underutilized in previous studies, particularly within the proposed model. By addressing these gaps, this study enhances theoretical and practical understanding of how universities can optimize service quality to strengthen student satisfaction and loyalty.

Figure 1.
Conceptual and Hypotheses Model



Source: Developed by author (2025)

RESEARCH METHODS

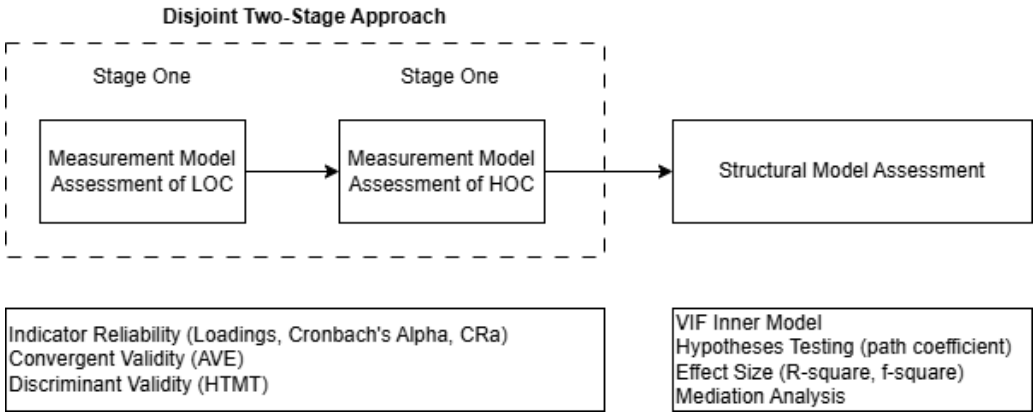
The study was conducted at the Faculty of Engineering, Universitas Negeri Jakarta. This study's population consisted of 5,843 actively enrolled students. The sample size was determined using proportionate stratified random sampling to account for heterogeneity in the population, where students were stratified by study program (due to divergent specializations and enrollment sizes) and academic year (third and fourth years). A total of 375 respondents were selected, with proportional representation across strata. Upper-year students were prioritized based on Oliver's (2010) loyalty framework, which posits that conative loyalty is most developed in later academic stages. Their prolonged exposure to university services ensures more stable evaluations of quality and satisfaction.

Data for this study were collected using a self-administered questionnaire. The aim was to explore students' perceptions of service quality, satisfaction, and loyalty through a 4-point Likert scale to reduce central tendency bias. The total number of items is 76 items. University service quality was calculated using 63 items adopted from the HEISQUAL instrument developed by Abbas (2020). Student loyalty was calculated using 6 items developed by Hennig-Thurau et al. (2001). Student satisfaction was calculated using 7 items Sultan & Yin Wong (2012) developed. A pilot study involving 30 respondents was conducted to validate the instrument, and the results indicated that it was both valid and reliable.

Partial Least Squares – Structural Equation Modelling (PLS-SEM) was chosen over Covariance-based SEM (CB-SEM) due to its suitability for exploratory studies and higher-order constructs. Higher-order constructs allow for the representation of a concept at a broader, more abstract

level while incorporating its specific lower-order subdimensions (Sarstedt et al., 2019). The service quality construct was modeled as a higher-order construct (HOC) with seven lower-order constructs (LOCs) corresponding to the HEISQUAL dimensions (Figure 1). Analysis was performed in SmartPLS 4 using a disjoint two-stage approach, which is more accurate in handling higher-order constructs on service quality. The disjoint two-stage approach consists of two primary steps for measurement model assessment. In the first stage, measurement model assessment is conducted on the lower-order constructs: seven service quality dimensions modeled as constructs. In the second stage, measurement model assessment is conducted on the higher-order construct, namely service quality, with seven dimensions of service quality modeled as indicators. The measurement model assessment parameters follow the standard PLS-SEM procedures but are executed in two stages due to the nature of the HOC modeling. The structural model was assessed through bootstrapping with 10,000 resamples, using the percentile method for confidence interval, significance 0.05, and two-tailed test type for direct and indirect effect on SmartPLS 4. The mediation analysis followed the guidelines by Hair et al. (2022), which evaluate indirect effects and their significance to determine whether the mediation is full or partial mediation by considering the significance and direction of direct relationships between constructs.

Figure 2.
Data Analysis Process



Source: Developed by author, adopted from Sarstedt et al. (2019)

RESULTS AND DISCUSSIONS

Based on the conceptual and hypotheses framework developed earlier, this section presents the study's empirical findings. Utilizing a PLS-SEM with a disjoint two-stage approach, we rigorously tested the relationships between public university service quality, student loyalty, and student satisfaction while accounting for the multidimensionality of service quality through the HEISQUAL framework.

Stage One: Assessment of Measurement Model of Lower-Order Construct

First, we assessed the measurement model for LOC, which is known as stage one. The parameters used for this assessment are the indicator's outer loading, Cronbach's alpha, composite reliability (CR^a), AVE, and HTMT (Hair et al., 2022). An indicator's outer loading is considered acceptable if its value is> 0.70. however, values below this threshold may still be retained if other parameters meet the required criteria. Cronbach's alpha and CR^a are deemed acceptable when their value is > 0.70. The AVE is accepted if > 0.5. The HTMT values are accepted if < 0.85 for different theoretical constructs and < 0.9 for similar theoretical constructs.

Figure 3.
Modeling for Lower-Order Construct

Source: Data Analysis using SmartPLS 4 (2025)

Figure 2 illustrates how LOC is modeled. The HEISQUAL dimension of the service quality construct is split into separate constructs, and each construct is interconnected with another construct. It can be seen that the arrows of each construct from the HEISQUAL dimensions point toward the student loyalty construct and student satisfaction construct. The LOC model is related to the conceptual model (Figure 1) that had been developed, where the service quality construct has a relationship with student loyalty and student satisfaction. So, in the LOC model, each dimension of HEISQUAL points towards student loyalty and student satisfaction, and then student satisfaction points towards student loyalty. Table 1 illustrates the validity and reliability results for LOC.

Table 1.
Assessment of Reliability and Validity for LOC

LOC	Items	Loadings	Cronbach's Alpha	CR[a]	AVE
TP	TP1	0.886	0.966	0.969	0.656
	TP2	0.757			
	TP3	0.740			
	TP4	0.718			
	TP5	0.893			
	TP6	0.904			
	TP7	0.827			
	TP8	0.908			
	TP9	0.748			
	TP10	0.895			
	TP11	0.728			
	TP12	0.727			
	TP13	0.890			
	TP14	0.732			
	TP15	0.734			
	TP16	0.895			
	TP17	0.722			
C	C1	0.852	0.823	0.828	0.656
	C2	0.819			
	C3	0.844			
	C4	0.718			
IF	IF1	0.769	0.887	0.892	0.502
	IF2	0.772			
	IF3	0.834			
	IF4	0.788			
	IF5	0.613			
	IF6	0.572			
	IF7	0.742			
	IF8	0.594			
	IF9	0.708			
	IF10	0.639			
MSS	MSS1	0.795	0.924	0.929	0.625
	MSS2	0.793			
	MSS3	0.826			
	MSS4	0.826			
	MSS5	0.812			
	MSS6	0.829			
	MSS7	0.800			
	MSS8	0.771			
	MSS9	0.644			
EQ	EQ1	0.773	0.903	0.907	0.632
	EQ2	0.807			
	EQ3	0.784			
	EQ4	0.780			
	EQ5	0.804			
	EQ6	0.836			
	EQ7	0.780			
SNS	SNS1	0.774	0.904	0.904	0.635
	SNS2	0.832			
	SNS3	0.825			
	SNS4	0.829			

LOC	Items	Loadings	Cronbach's Alpha	CR[a]	AVE
	SNS5	0.791			
	SNS6	0.788			
	SNS7	0.732			
SSD	SSD1	0.678	0.908	0.913	0.577
	SSD2	0.673			
	SSD3	0.733			
	SSD4	0.769			
	SSD5	0.783			
	SSD6	0.839			
	SSD7	0.743			
	SSD8	0.820			
	SSD9	0.782			
SL	SL1	0.755	0.856	0.861	0.582
	SL2	0.812			
	SL3	0.726			
	SL4	0.780			
	SL5	0.780			
	SL6	0.722			
SS	SS1	0.785	0.885	0.890	0.593
	SS2	0.744			
	SS3	0.747			
	SS4	0.786			
	SS5	0.838			
	SS6	0.821			
	SS7	0.657			

Source: Data Analysis using SmartPLS 4 (2025)

The first assessment conducted is the indicator's outer loading. Table 1 shows that some items have values < 0.70 such as IF5, IF6, IF8, IF10, MSS9, SSD1, SSD2, and SS7. Since the value is not < 0.40, it can be retained if it is eligible for Cronbach's alpha, CR[a] and AVE values. The results also show that all the constructs meet the requirements of > 0.7 for Cronbach's alpha dan CR[a], and > 0.5 for AVE. So, it can be concluded that no items were discarded in LOC.

The highest outer loading value indicates that an indicator substantially contributes more to measuring the construct (Hair et al., 2022), in this case, the service quality dimension. In the teachers' profile dimension, there is TP8, namely "my lecturer communicates politely and respectfully", has a value of 0.908. In the curriculum dimension, there is C1, namely "the curriculum taught is comprehensive and easy to understand", has a value of 0.852. In the infrastructure and facilities dimension, there is IF3, namely "the number of students per class is set at a low to medium level", has a value of 0.834. In the management and education personnel dimension, there is MSS6, namely "education personnel at UNJ store data/records accurately and up-to-date", has a value of 0.829. In the work quality dimension, there is EQ6, namely "graduates from UNJ are very easily absorbed and have high demand in the industry", has a value of 0.836. In the safety and security dimension, there is SNS2, namely "security officers at UNJ are the best and professional", has a value of 0.832. In the dimension of student skill development, there is SSD6, namely "the UNJ environment develops students' self-confidence and emotional stability", has a value of 0.839. Indicators with the highest outer loading values can be used as a reference by university management in managing the quality of university services.

Table 2.
Discriminant Validity – HTMT

	C	EQ	IF	MSS	SL	SNS	SS	SSD	TP
C									
EQ	0.605								
IF	0.607	0.752							
MSS	0.569	0.702	0.736						
SL	0.551	0.653	0.688	0.608					
SNS	0.555	0.755	0.814	0.727	0.613				
SS	0.546	0.609	0.693	0.654	0.800	0.648			
SSD	0.648	0.768	0.829	0.781	0.659	0.850	0.659		
TP	0.789	0.713	0.815	0.666	0.622	0.711	0.637	0.743	

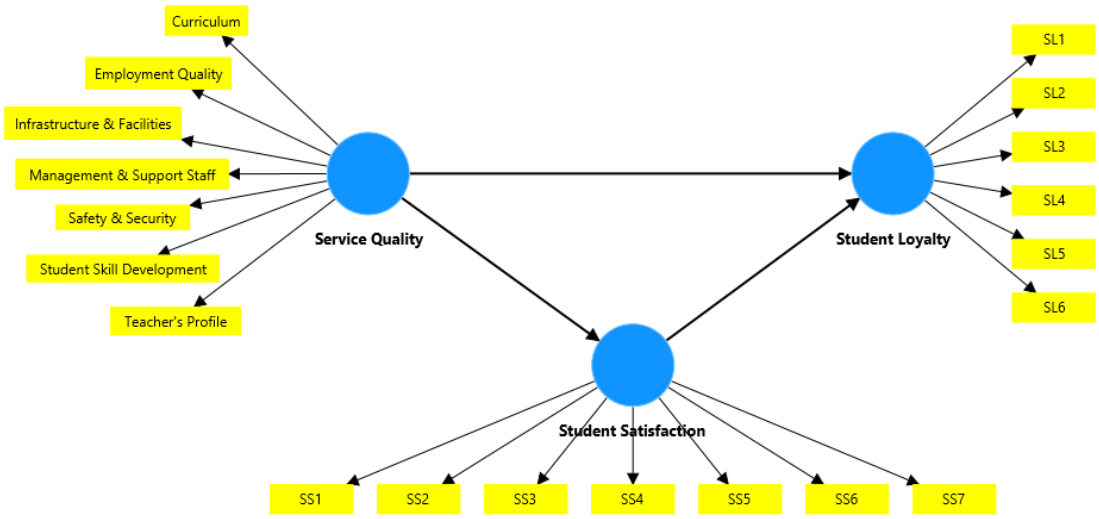
Source: Data Analysis using SmartPLS 4 (2025)

Table 2 illustrates the discriminant validity (HTMT) results for LOC. All constructs have a value of < 0.850, thus meeting the requirements except for SSD-SNS. However, since both are part of the service quality (HOC), they are conceptually similar constructs. So, it can still be categorized as fulfilling because the value < 0.90. Therefore, the measurement model assessment for LOC meets the specified parameter requirements. The assessment of the HOC measurement model is explained in stage two.

Stage Two: Assessment of Measurement of Higher-Order Construct

Second, we assessed the measurement model for HOC, known as stage two. The parameters used for this assessment are the same as for LOC, which is the indicator's outer loading, Cronbach's alpha, CR[a], AVE, and HTMT. However, the difference is that this assessment focuses only on HOC, namely service quality. In stage two, latent variable scores from LOC testing are used to replace HEISQUAL dimensions that were previously constructed into indicators. For easier understanding, consider Figure 3 and Figure 4.

Figure 4.
Modeling for Higher-Order Construct



Source: Data Analysis using SmartPLS 4 (2025)

By comparing Figure 2 with Figure 3, it can be noted that in HOC, the HEISQUAL dimension, which was previously a construct, turned into an indicator. The indicator values are derived from

latent variable scores obtained in stage one. For the constructs of student loyalty and student satisfaction, they still use the same data, the Likert scale. So, the results presented are only the results for the service quality construct because the results for the student loyalty and student satisfaction constructs are the same as in stage one.

Table 3.
Assessment of Reliability and Validity for HOC

HOC	Items	Loadings	Cronbach's Alpha	CR[a]	AVE
SQ	TP	0.871	0.929	0.933	0.704
	C	0.714			
	IF	0.874			
	MSS	0.824			
	EQ	0.834			
	SNS	0.855			
	SSD	0.887			

Source: Data Analysis using SmartPLS 4 (2025)

Table 3 illustrates the reliability and validity of the results for HOC. The first assessment carried out is the indicator's outer loading. The results show that all items are accepted because they have a value > 0.70. The results also exhibit that all the constructs meet the requirements of > 0.70 for Cronbach's alpha and CR[a] and > 0.5 untuk AVE, so it can be concluded that there are no discarded items in HOC.

The highest outer loading value indicates that an indicator has a more substantial contribution in measuring the construct. Therefore, the indicators of each variable that contribute the most can be identified. In the service quality variable, there is an SSD indicator, namely Student Skills Development, which contributes the most in measuring the quality of Faculty of Engineering UNJ services with a value of 0.887.

Table 4.
Discriminant Validity – HTMT

	SL	SQ	SS
SL			
SQ	0.742		
SS	0.800	0.751	

Source: Data Analysis using SmartPLS 4 (2025)

Table 4 illustrates the results of discriminant validity using HTMT for HOC. All constructs have values < 0.850, thus meeting the requirements for conceptually distinct constructs. Therefore, the measurement model assessment for HOC meets the specified parameter requirements. The next assessment to conduct is a structural model assessment.

Structural Model Assessment

The bootstrapping procedure was conducted with 10,000 subsamples, using the percentile bootstrap method for confidence intervals and a two-tailed test with a significance level of 0.05. a fixed seed was applied to analyze the path coefficients between constructs. Before performing bootstrapping, collinearity statistics were examined by assessing the variance inflation factor of the inner model to evaluate the structural model.

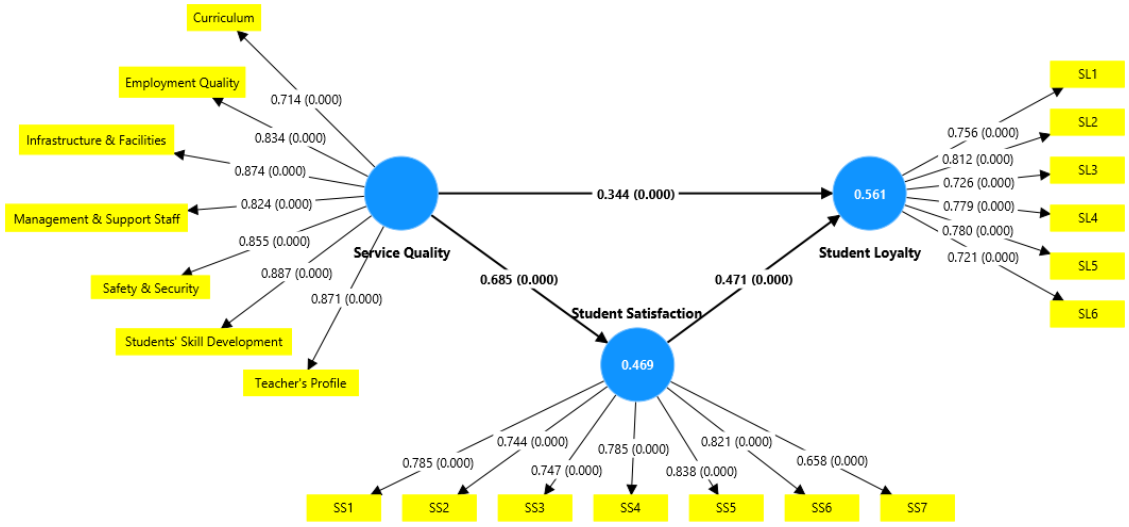
Table 5.
Collinearity Statistics – VIF of Inner Model

Exogenous Variable	Endogenous Variable	VIF
SQ	SL	1.882
SQ	SS	1.000
SS	SL	1.882

Source: Data Analysis using SmartPLS 4 (2025)

Table 5 shows the collinearity statistics (VIF) results of the inner model. Corresponding to Hair et al. (2022), the VIF values are preferably below a value of 3, therefore there's no substantial effect on the structural model estimates. Then, the bootstrapping procedure can be conducted.

Figure 5.
PLS-SEM Results



Source: Data Analysis using SmartPLS 4 (2025)

Figure 4 presents the PLS-SEM results obtained from the bootstrapping procedure. The outer model displays the outer loadings along with their p-values, while the inner model presents the path coefficients and corresponding p-values. The value shown on each construct represents the R^2 value, indicating that 56.1% of the variation in student loyalty is explained by service quality and student satisfaction. Similarly, 46.9% of the variation in student satisfaction is explained by service quality.

Table 6.
Hypotheses Testing

Hypothesis	Standard beta	t statistics	p-value	Decision
H1: SQ → SL	0.344	6.802	0.000	Accepted
H2: SQ → SS	0.685	18.100	0.000	Accepted
H3: SS → SL	0.471	9.808	0.000	Accepted
H4: SQ→ SS → SL	0.322	7.687	0.000	Accepted

Source: Data Analysis using SmartPLS 4 (2025)

Table 6 shows the results of the hypotheses testing. The hypothesis can be accepted if the results are significant and the requirement for this study is p value < 0.05. In addition, it can also be compared between t statistics and t table, which is > 1.96 for 5% significance. The results show

that all hypotheses are accepted because they have p values < 0.05 and t statistics > 1.96. The standard beta value shows that the relationship between constructs is positive with the value getting closer to 1 meaning the relationship is strong. The value of t statistics and p-value value show significance. The direct relationship between constructs shown in H1 – H3 shows positive and significant results. Referring to Hair et al. (2022), the mediating role of student satisfaction variables is partial mediation.

Table 7.
Effect Size

Exogenous Variable	Endogenous Variable	R^2	f^2	Effect
SQ	SL	0.561	0.143	Medium
SS	SL		0.268	High
SQ	SS	0.469	0.882	High

Source: Data Analysis using SmartPLS 4 (2025)

Table 7 presents the effect size of each relationship within the model. The f^2 value represents the effect size of the direct relationship. Service quality and student loyalty relationships fall within the small-to-medium effect. Service quality and student satisfaction relationships have a large effect. Student satisfaction and student loyalty relationship falls into the medium effect. In addition, the f^2 value or effect size shows that student satisfaction has a greater contribution than service quality to variance (0.268 > 0.143). This result strengthens student satisfaction as a mediator in the relationship between service quality and student loyalty.

Discussion

The Influence of Public University Service Quality on Student Loyalty

To sustain a competitive advantage, public universities must enhance the services offered to students throughout their academic journey. This enhancement is done to develop loyalty in students. So that after graduation, they will show commitment and behavior to continue to be associated with the university (Usman & Mokhtar, 2016). Loyal students will continue contributing to their institution after graduation and will promote the university well (Yang & Mutum, 2015). Furthermore, loyal students will collaborate with the university through internships, employment fairs, or as guest lecturers (Alwi et al., 2019). The finding of this study exhibits a significantly positive influence of public university service quality on student loyalty. The effect size of this relationship is medium, which suggests a moderate effect of service quality on student loyalty. Therefore, while quality of service matters, other elements (such as student satisfaction) also play a significant role in driving student loyalty.

Previous studies by Annamdevula & Bellamkonda (2016), Mutum et al. (2023), Supriyanto et al. (2024), and Windasari et al. (2021) revealed that service quality has a positive influence on student loyalty. However, the studies from Chandra et al. (2019) and Kusyana et al. (2020) revealed the opposite results. These inconsistent results could happen due to the different contexts of public and private universities and the location of study, whose students might have different behaviors. The results of this study and previous studies, indicate that an enhancement in the quality of service within public universities leads to a corresponding increase in student loyalty. This study also contributes to empirical evidence of the Relationship Quality-Based Loyalty theory by Hennig-Thurau et al. (2001). These findings highlight the necessity for universities to enhance their service quality consistently. By utilizing the HEISQUAL framework, public universities should enhance various aspects of services. Students who perceive that their universities deliver high-quality services, are more likely to develop loyalty. Therefore, public

universities must strive to improve services while building strong relationships with students to develop and maintain student loyalty.

The Influence of Public University Service Quality on Student Satisfaction

The characteristics of public university service quality are those that can generate student satisfaction. Corresponding to Wong & Chapman (2023), student satisfaction was a condition experienced by students when universities met their expectations about services. The study's findings show that public university service quality positively influence on student satisfaction. Due to the significant effect, this strong relationship suggest that service quality is key in shaping student satisfaction. Previous studies by Annamdevula & Bellamkonda (2016), Chandra et al. (2019), Kusyana et al. (2020), Mutum et al. (2023), Supriyanto et al. (2024), and Windasari et al. (2021) revealed that service quality has a positive influence on student satisfaction. However, the study by Hussein & Kamil (2022) revealed the opposite result. These inconsistent results could happen due to the different locations of study, whose students might have different behaviors. Different models proposed by other researcher could also affect the study's results, such as not considering the mediating role of student satisfaction in their model. The results of this and previous studies show that the higher public university service quality, the higher the student satisfaction. This result also contributes to empirical evidence of the Expectancy Disconfirmation theory by Oliver (2010). Given the positive influence and significant effect of service quality on student satisfaction, it suggests that improvements in service quality strongly enhance student satisfaction, making it a critical area of focus for universities. Pratiwi et al. (2024) explained that public universities, as part of public services, have an obligation and duty to meet students' needs and have the right to expect and demand the best services from universities. Public universities should implement regular assessment tools, such as student satisfaction surveys and service audits, to monitor and improve the quality of academic and overall services. Fitzpatrick et al. (2016) stated that while unsatisfied students will foster a hostile climate that could damage the institution's reputation and influence, satisfied students are an excellent resource of recommendations for the institution. Any efforts to enhance student satisfaction should start with improving service quality dimensions.

The Influence of Student Satisfaction on Student Loyalty

A positive repeat experience will strengthen student satisfaction, encouraging students to deepen their loyalty. Student satisfaction is an important source for universities because student loyalty is the consequence of student satisfaction (Fitzpatrick et al., 2016; Quintal & Phau, 2016). The finding of this study exhibits that student satisfaction has a significantly positive influence on student loyalty. Previous studies by Annamdevula & Bellamkonda (2016), Chandra et al. (2019), Kusyana et al. (2020), Mutum et al. (2023), Supriyanto et al. (2024), and Windasari et al. (2021) revealed that student satisfaction has a positive influence on student satisfaction. However, the study from Võ (2021) revealed the opposite result. These inconsistent results could happen due to the different locations of study, whose students might have different behaviors. Different models proposed by other researcher could also affect the study's results, such as not considering the mediating role of student satisfaction in their model. Findings from this study and previous studies indicate that higher student satisfaction leads to stronger student loyalty. This result also contributes to empirical evidence of the loyalty theory by Oliver (2010). This relationship also has a medium effect, suggesting that students are an important driver of student loyalty. Satisfied students are more likely to remain engaged with their university over time by recommending their university to peers, engaging in alumni activities, and considering further studies at the same universities. This finding also suggests that universities should prioritize policies and initiatives that enhance student experiences, ensuring

high satisfaction to develop and sustain student loyalty. However, since this relationship only has a medium effect, other factors such as personal experiences, institutional reputation, or financial considerations might also contribute to the outcome of student loyalty.

The Mediating Role of Student Satisfaction

When students are pleased with the services they receive and have favorable perceptions of the university, they are more likely to return (Muchiri et al., 2016). Students who are satisfied with the services will show loyalty by continuing their studies in the university, recommending the university to others, and providing support for a long time as alumni. The finding of this study exhibits that student satisfaction partially mediates the relationship between public university service quality and student loyalty. Previous studies by Annamdevula & Bellamkonda (2016), Kusyana et al. (2020), Mutum et al. (2023), and Supriyanto et al. (2024) revealed that student satisfaction acts as mediator on service quality and student loyalty. This result implies that while service quality directly influences loyalty, a portion of this effect is channeled through student satisfaction. In other words, service quality directly and indirectly enhances student loyalty by increasing student satisfaction. This partial mediation underscores the importance of satisfaction as a reinforcing mechanism, strengthening their loyalty. This result also contributes to empirical evidence of the loyalty theory by Oliver (2010). Therefore, public universities should focus on improving service quality and ensure that students perceive and appreciate these improvements. Transparent communication and student participation in managerial and proactive student services can further enhance satisfaction levels, leading to stronger loyalty.

CONCLUSIONS

This study underscores the pivotal role of public university service quality and student satisfaction in fostering student loyalty, offering actionable insights for public universities navigating competitive and resource-constrained environments. Employing the HEISQUAL framework and the PLS-SEM with a disjoint two-stage approach demonstrates that service quality directly enhances loyalty while also influencing through student satisfaction as a partial mediator. The key findings of this study are as follows: (1) public university service quality has significantly positive influence on student loyalty; (2) public university service quality has significantly positive influence on student satisfaction; (3) student satisfaction has significantly positive influence on student loyalty; and (4) student satisfaction has a role of partial mediation between service quality and student loyalty. Overall, this study highlights the crucial role of university service quality and student satisfaction in fostering student loyalty. HEIs aiming to enhance student loyalty should adopt a dual focus on service quality and satisfaction enhancement, ensuring a holistic approach to student engagement and retention, leading to loyalty.

Practical implications for public universities, specifically for the Faculty of Engineering UNJ, can be determined based on the findings on the outer loading value. The dimension of students' skills development (SSD) received the highest value of 0.887, indicating that student skills development is the dimension that contributes most strongly to service quality. The item "UNJ environment develops students' self-confidence and emotional stability" has the highest outer loading value of 0.839. This result indicates that this item is the one that contributes most strongly to student skills development, highlighting the importance of a university environment that supports student self-development. Therefore, the Faculty of Engineering UNJ must further strengthen strategies in programs on campus that aim to increase student self-confidence and emotional stability. Faculty management can actively involve students in various activities organized by UNJ. Students who are actively involved in a program tend to be more confident

than those who are not. Faculty of Engineering UNJ can routinely promote mental health support services at the Guidance and Counseling Service. Through the Guidance and Counseling Service, routine evaluations regarding student mental health are carried out to ensure that student emotional stability is maintained. This evaluation can be done through an online survey on the lecture evaluation at the end of the semester. Mental health services and evaluations will create a positive perception of students towards the Faculty of Engineering UNJ supporting students' emotional stability.

This study has limitations that can be used as references for further studies. This study uses a cross-sectional method to collect survey data to find information at one time. Thus, although this method can identify relationships between variables, it does not capture changes over time. Further study can consider longitudinal methods in data collection to gain a more dynamic understanding of the relationships between variables that develop and change over time. This study was conducted at the Faculty of Engineering UNJ, which may limit the generalization of the research results. Further study can expand the research context, for example, at the university level or higher levels, such as provinces or national, to obtain more holistic generalizations. The model in this study focuses on public university service quality, student loyalty, and student satisfaction, which limits existence of other factors that shape student loyalty. This study model explains 56.1% of the variance in student loyalty, namely public university service quality and student satisfaction, while 43.9% is explained by variances not discussed in this study. Further study can develop the model by adding other factors that shape student loyalty as variables.

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