Maintaining service quality: Examining the impact of the HESQUAL scale on student satisfaction in HEIs

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ARTICLE INFO

Received 2024-09-11
Revised 2025-04-15
Accepted 2025-06-27
Published 2025-07-31

Keywords
Heisqual
Service Quality
Student Perceived Value
Student Satisfaction
Technology Support

ABSTRACT

This study aims to examine the effect of service quality and technology support on student satisfaction through student perceived value. Research in Indonesia has yet to extensively investigate service quality in the education sector using the Higher Education Service Quality (HESQUAL) framework, which provides a more accurate measurement for higher education settings. Previous studies have often utilized SERVQUAL indicators, which are not fully suitable for evaluating quality in the context of higher education institutions (HEIs). Moreover, the role of technology support in shaping student perceived value within HEIs has not been thoroughly explored in prior research. A quantitative approach was adopted in this study, employing a non-probability sampling method using purposive sampling. The sample consisted of 246 postgraduate students from a public university in Indonesia. Data analysis was conducted using Partial Least Squares Structural Equation Modeling (SEM-PLS) to examine the relationships among the variables. The findings reveal that service quality, as measured by HESQUAL, has a positive and significant effect on student satisfaction, but does not significantly influence student perceived value. In contrast, technology support has a positive and significant impact on both student perceived value and student satisfaction. These results highlight the critical role of service quality in enhancing student satisfaction within HEIs. The novelty of this study lies in its application of the HESQUAL framework as a context-specific instrument for measuring service quality in higher education, thereby addressing a methodological gap in Indonesian educational research where this approach has been scarcely utilized.

1. Introduction

Service quality measurement is a crucial aspect of educational institutions. Several previous studies have highlighted the importance of measuring service quality, with key reasons including the identification of determinants, the improvement of service performance [1], the efficient allocation of resources for better student services [2], the provision of motivation and feedback on the effectiveness of educational plans and their implementation [3], the identification of gaps and opportunities for continuous improvement [4], and contributions to better student outcomes [5]. Additionally, understanding students' perspectives and enhancing their experiences within higher education institutions (HEIs) is essential. Superior service quality in educational institutions significantly contributes to students' learning experiences during their academic journey and to the academic outcomes they achieve [6]. Measuring service quality provides valuable insights and benefits to both

university administrators and students. For educational institutions, the benefits include the ongoing enhancement of the educational process based on the evaluations obtained [7]. For students, service quality measurement ensures that the quality of services is consistently monitored, enabling them to acquire competencies aligned with the established graduate outcomes [8]. HEIs can more easily understand students' needs and expectations when organizing academic activities. Moreover, service quality measurement serves as an effective feedback tool. The data collected from students regarding their experiences and the learning process can be used as a reference to assess the effectiveness of the educational plans that have been designed and implemented [9]. This enables HEIs to make necessary adjustments to achieve educational goals that are oriented toward excellence and the competitiveness of graduates. Identifying strengths and weaknesses in HEI service quality helps create a conducive learning environment aimed at improving student learning outcomes. Service quality measurement also benefits institutions in formulating strategies to enhance academic advising services, such as increasing the number of academic advisors or providing additional support for students in their academic writing [10]. Understanding students' perspectives is a crucial step in improving the quality of educational services. Since students are the primary recipients of HEI services, they are key stakeholders in the effort to enhance service quality. Students who feel heard and valued tend to have higher levels of satisfaction and are more engaged in the learning process [11]. Understanding students' perspectives can also assist institutions in designing a more relevant curriculum. Institutions can tailor learning content to better align with the skills and competencies required in the workforce. Furthermore, service quality can be improved by addressing students' perspectives on the development of support services, such as mental health services. Previous research found that students who feel emotionally supported tend to perform better academically [12]. Institutions can ensure that students receive the necessary support by assessing the quality of mental health services and other academic-related metrics as part of overall service quality in HEIs [13].

The development of Information and Communication Technology (ICT) has transformed the way students learn and access educational materials. In higher education institutions (HEIs), the use of technology is not merely a tool but also contributes significantly to students' perceived value of their learning experiences. According previous study the integration of technology in learning can enhance student engagement, thereby increasing the perceived value of HEIs [14]. Perceived value refers to an individual's assessment of the benefits derived from a product or service [15]. The quality of the materials taught, interaction with instructors, and the availability of information technology support all play roles in shaping students' perceived value [16]. The role of information technology in supporting the learning process is crucial for HEIs to enhance this perceived value. Previous research found that students who use interactive online learning platforms have a more positive learning experience compared to those who rely on conventional teaching method [17]. Technology serves as a bridge between students and a broader range of educational resources. For instance, access to research databases, online seminars, and MOOCs provides students with opportunities to expand their knowledge [18]. The integration of technology not only expands access to knowledge but also augments its perceived value. Students perceive that access to information technology significantly enhances capacity for independent learning [19]. Student satisfaction is a key indicator in assessing the quality of services provided by higher education institutions (HEIs). Student satisfaction defined as a short-term attitude that emerges from an evaluation of students' educational experiences, services, and facilities [20]. Other studies, describe student satisfaction as the degree to which students' expectations and needs are fulfilled [21]. Perceived educational service quality and value for money are among the most influential factors affecting student satisfaction [22]. Despite the importance of student satisfaction, there is still a lack of research that focuses on analyzing it from the perspective of higher education institutions as organizations. Previous studies have largely focused on evaluating the learning process such as [23] or facilities [24], without considering the HEI as a whole. Much of the existing research has focused on individual factors that contribute to student satisfaction, for example [25]. Research indicates that course structure exerts a greater influence on student satisfaction and achievement compared to factors like student-student interaction and instructor presence [26]. Additionally, students' self-efficacy and the information they possess at the beginning of their studies predict their persistence, which subsequently influences their overall satisfaction [14]. There is a lack of research addressing how organizations deliver services within the framework of service quality, leaving the organizational level underexplored. Given that organizations hold significant power in delivering student satisfaction, further research at the organizational level is necessary.

Various indicators have been employed to measure service quality. Initially, service quality was assessed using the SERVQUAL model developed by Parasuraman [27], which measured five

dimensions: reliability, responsiveness, assurance, empathy, and tangibles. This model has been widely applied across different sectors, such as banking, transportation, and various service industries. However, HEIs are distinct entities that cannot be directly compared to other service-oriented organizations, leading to the development of specialized measurements to assess service quality in educational institutions. The development of service quality measurement in HEIs continues to evolve. This study utilizes the HESQUAL framework proposed by [28] to further analyze service quality, with a specific focus on the educational context. This study identifies three significant gaps in previous research that are crucial yet understudied. First, there is a lack of research from an organizational perspective on how HEIs deliver student satisfaction, as most studies have focused on psychological aspects influencing student satisfaction such as [25], [29]. Further research is needed to explore the organizational factors that contribute to student satisfaction, particularly within the context of HEIs. Second, while numerous studies have evaluated service quality, few have specifically employed indicators tailored to the context of educational service quality in HEIs. Third, the role of technological support in influencing student satisfaction has not been extensively researched, with prior studies primarily focusing on how technology usage affects satisfaction rather than how support structures contribute to it. This research aims to examine the impact of service quality and technological support on student satisfaction, mediated by perceived value. The study utilizes service quality indicators specifically designed for the educational context. The urgency of this research lies in the need to measure service quality through education-specific assessments, providing deeper insights into HEI operations. Additionally, it is crucial to assess student satisfaction within HEIs. When an organization can identify and effectively meet student satisfaction, it paves the way for continuous improvement and the sustainability of the institution. Ultimately, student satisfaction serves as a reflection of an HEI's success in delivering superior educational services.

2. Method

A quantitative approach is employed in this study to test the proposed hypotheses and identify causal relationships among the investigated variables [30]. The study focuses on four variables: service quality, technology support, perceived value, and student satisfaction. The research is causal in nature, aiming to determine the impact of independent variables on the dependent variables. It involves the collection of numerical data, which is analyzed statistically to provide objective conclusions that can be tested and generalized, Table 1 is research indicator.

Table 1. Research Indicator

Variable	Code	Indicator
Service Quality (HESQUAL)	H1	Attitude and behavior of administrative staffs
	H2	Administrative processes
	H3	Learning setting
	H4	General infrastructure
	H5	Attitude and behavior of academics
	H6	Curriculum
	H7	Pedagogy
	H8	Competence of academics
	H9	Support facilities
Student Perceived Value	SPV1	The university's overall costs are fair
	SPV2	The value I receive from the university matches the effort I put in
	SPV3	The university provides good value for the financial investment made
Student Satisfaction	SS1	Enrolling at my university was a smart decision.
	SS2	This university is perfectly suited for higher education studies.
	SS3	Choosing this university was the right decision.
	SS4	I am pleased to be a student at my university.
	SS5	I am enjoying my studies here.
	SS6	I am satisfied with my experience as a student at my university.
Technology Support	TS1	The virtual classroom environment at my university effectively supports my learning process
	TS2	I have easy access to online journals and resources needed for my studies
	TS3	The university's website is user-friendly and regularly updated with important information
	TS4	The use of biometric machines enhances security and convenience on campus
	TS5	The soft skills programs offered by the university have helped me develop important professional competencies
	TS6	The advanced laboratory facilities at my university are adequate for conducting research and practical experiments

The sample for this study was selected using a non-probability sampling method with purposive sampling technique. Non-probability sampling implies that not all individuals in the population have an equal chance of being selected as a sample. In purposive sampling, the sample is chosen based on specific criteria set by the researcher to ensure that the selected individuals have characteristics relevant to the research objectives. The sample criteria for this study were postgraduate students from public universities in Indonesia. Using Cochran's formula, with a confidence level of 95%, a margin of error of 5%, and a population proportion of 20%, a sample size of 246 was determined to be required. Structural Equation Modeling - Partial Least Squares (SEM-PLS) is the appropriate data analysis technique for this study due to its superior capability in modeling predictions and testing complex relationships among constructs [31]. SEM-PLS is utilized in this research to develop theory and explore the effects among variables.

3. Results and Discussion

The results section presents both the outer model and the inner model. In the outer model, the validity and reliability test results are displayed in Table 2. Table 2 presents the results of the validity and reliability tests. All loading factors in Table 2 show values above 0.7, indicating that all indicators in this study are valid. Additionally, the validity is further supported by the Average Variance Extracted (AVE) values, which are greater than 0.5. Based on Table 2 can be concluded that all variables demonstrate consistency, as indicated by Cronbach's Alpha and Composite Reliability values greater than 0.7. Therefore, this study has demonstrated both validity and reliability and can proceed to the next phase of testing.

Table 2. Validity and Reliability Test

Variable	Indicator	Loading Factor	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Service Quality (Hesqual)	H1	0.821	0.961	0.967	0.766
	H2	0.844			
	H3	0.894			
	H4	0.898			
	H5	0.923			
	H6	0.922			
	H7	0.901			
	H8	0.856			
	H9	0.808			
Student Perceived Value	SPV1	0.960	0.959	0.974	0.925
	SPV2	0.966			
	SPV3	0.959			
Student Satisfaction	SS1	0.938	0.968	0.974	0.86
	SS2	0.928			
	SS3	0.929			
	SS4	0.937			
	SS5	0.923			
	SS6	0.909			
Technology Support	TS1	0.886	0.966	0.972	0.855
	TS2	0.927			
	TS3	0.945			
	TS4	0.953			
	TS5	0.884			
	TS6	0.950			

Based on the results of the model fit test, as shown in Table 3, the SRMR value is less than 0.08, and the NFI value exceeds 0.9. This indicates that the construct developed in this study demonstrates a good model fit. The model fit, as reflected in the research, meets the statistical criteria.

Table 3. Goodness of Fit Model Result

	Saturated Model	Estimated Model
SRMR	0.048	0.048
d_ULS	0.702	0.702
d_G	1.275	1.275
Chi-Square	1216.297	1216.297
NFI	0.916	0.916

Table 4 presents the coefficient of determination, which represents the impact of the independent variables on the dependent variable. The R-squared value exceeding 0.9 indicates a strong influence. Coefficient of determination is typically classified into low, medium, and high categories. The results of this study demonstrate that the model has a high coefficient of determination, suggesting that the dependent variable is effectively explained by the independent variables.

Table 4. Coefficient of Determination Result

	R Square	R Square Adjusted
Student Perceived Value	0.913	0.912
Student Satisfaction	0.921	0.919

In this study, Fig. 1 illustrates the relationships among the variables. Additionally, Table 5 presents the direct effects between these variables, while Table 6 highlights the indirect effects.

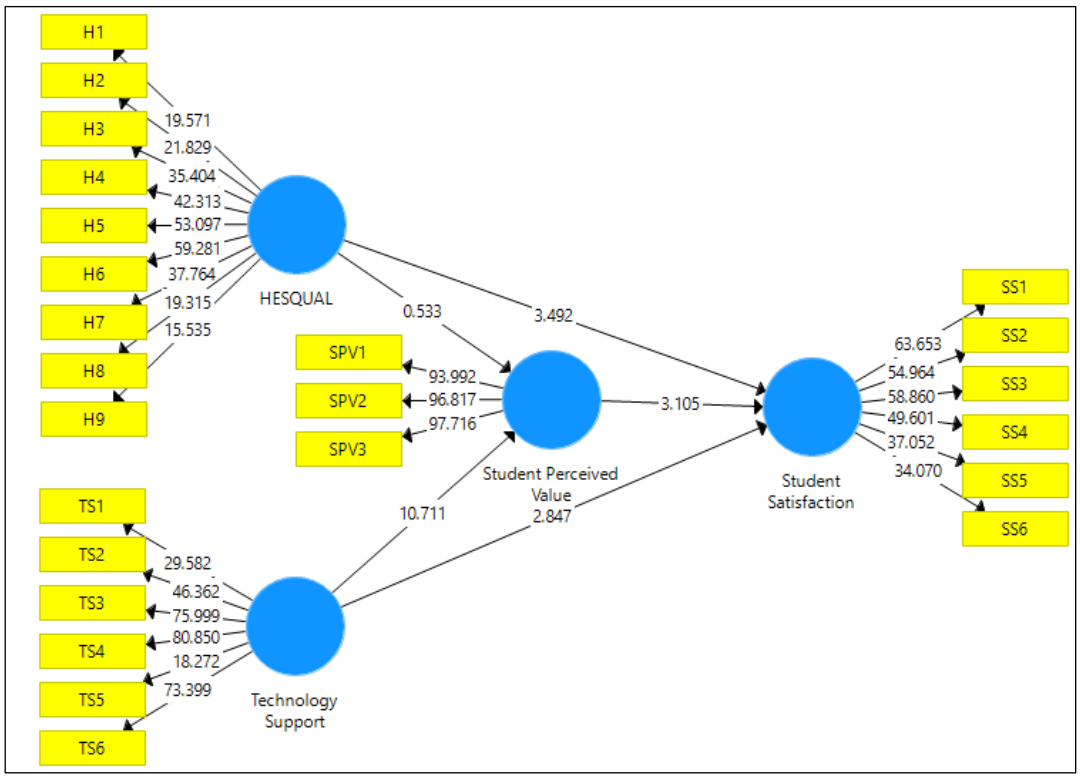

Fig. 1. Research Model

The results presented in Table 5 indicate a positive and significant direct effect of service quality on student satisfaction (α= 3.492, sig.0.001). However, service quality does not impact student perceived value (α= 0.533, sig.0.594). Additionally, student perceived value has a direct influence on student satisfaction (α= 3.105, sig.0.002). The study also reveals that technology support affects both student perceived value (α= 10.711, sig.0.000) and student satisfaction (α= 2.847, sig.0.005).

Table 5. Direct Effect Result

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Service Quality (HESQUAL) → Student Perceived Value	0.057	0.039	0.107	0.533	0.594
Service Quality (HESQUAL) → Student Satisfaction	0.22	0.214	0.063	3.492	0.001
Student Perceived Value → Student Satisfaction	0.358	0.344	0.115	3.105	0.002
Technology Support → Student Perceived Value	1.007	0.988	0.094	10.711	0.000
Technology Support → Student Satisfaction	0.409	0.428	0.144	2.847	0.005

Table 6 demonstrates a significant mediating effect of student perceived value on the relationship between technology support and student satisfaction (α= 3.125, sig.0.002). Conversely, service quality does not have its effect on student satisfaction mediated by student perceived value (α= 0.516, sig.0.606).

Table 6. Indirect Effect Result

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Service Quality (HESQUAL) → Student Perceived Value → Student Satisfaction	0.020	0.012	0.039	0.516	0.606
Technology Support → Student Perceived Value → Student Satisfaction	0.360	0.338	0.115	3.125	0.002

3.1. Discussion

The findings of this study indicate that service quality positively affects student satisfaction. Previous research has demonstrated that educational service quality directly contributes to student satisfaction. This study aligns with [28], which found that dimensions of service quality measured through HESQUAL positively impact student satisfaction. The results suggest that students who perceive high service quality are generally more satisfied with their learning experiences. This finding supports the research by [32], which emphasizes that high service quality can enhance student satisfaction to the institution. It is consistent with [33], who stated that reliability in educational services is a key factor in creating a positive student experience. Additionally, this study found that physical evidence, such as facilities and the learning environment, plays a significant role in influencing students' perceptions of service quality. Previous research corroborates this perspective, demonstrating that high service quality in educational institutions plays a crucial role in enhancing student satisfaction [34]. Their findings indicate that students who express satisfaction with the services provided are more likely to exhibit increased motivation and achieve superior academic outcomes.

The results indicate that service quality, as measured by HESQUAL, does not significantly affect student perceived value. This finding contrasts with previous studies that have shown a significant impact of service quality on student perceived value. For instance, [28] found a positive and significant relationship between service quality and student perceived value. Although students appreciate the service quality provided, its impact on perceived value is not as strong as anticipated [35]. This study suggests that students may place more emphasis on other factors, such as curriculum relevance and practical experience, when evaluating the quality of educational services. This result consistent with previous research, which indicate that service quality is only one of many factors influencing perceived value [21]. The comparison suggests that while HESQUAL provides a useful model for evaluating educational service quality, its impact on student perceived value is not always direct. One key factor affecting student perceived value is the learning experience itself. Previous research found that positive learning experiences can enhance students' perceived value, including interactions with instructors and the quality of the taught material [36]. Students with strong social support tend to have higher perceived value [37]. This support can come in the form of academic assistance, motivation, and involvement in group activities, indicating that social interactions in higher education environments play a crucial role in shaping students' perceived value. Curriculum relevance also plays a critical role in determining student perceived value. Students tend to have a higher perceived value for programs that align with industry needs. Students who perceive curriculum as relevant to the job market tend to assign a higher perceived value to it, even when the quality of services provided is not consistently optimal [38].

In the digital age, technology has become an integral part of the educational process. This study finds that technology support positively impacts student satisfaction. The results align with findings that students believe the use of technology in learning enhances their learning experience [39]. Student satisfaction is a crucial indicator of educational success. Students with adequate access to technology tend to be more satisfied with their learning experiences [40]. This finding consistent with [41], who emphasized that good technology support contributes to increased student motivation and engagement. Technology support in education includes various tools and platforms used to facilitate

the teaching and learning process. The use of Learning Management Systems (LMS) such as Moodle and Blackboard has proven effective in improving the accessibility of learning materials [42]. This finding supports the notion that many higher education institutions (HEIs), particularly public universities, have significantly developed technology-supported learning. Students express higher satisfaction with technology-enhanced learning methods compared to conventional approaches, indicating that technology support not only facilitates learning but also contributes to greater student satisfaction.

Digital interactions, such as online discussion forums and video conferencing, also play a significant role in enhancing student satisfaction and perceived value. The research shows that technology support positively affects student perceived value. Previous study found that interactions occurring through digital platforms can increase students' sense of engagement in the learning process [25]. Students who actively participate in online discussions report higher levels of satisfaction compared to those relying solely on conventional learning materials. This indicates that technology support not only facilitates learning but also enhances student perceived value. Previous research further supported this by showing that the use of technology in education can boost student engagement, which contributes to perceived value [43]. Technology support in education encompasses various tools and platforms designed to enhance the learning experience. The use of LMS can enhance the accessibility of learning materials, thereby shaping student perceived value [44]. When used effectively, technology can increase student engagement through more dynamic and interactive interactions. The application of technology, such as gamification and interactive simulations, can create more engaging learning experiences.

The study has demonstrated that student perceived value positively influences student satisfaction. Previous research indicates that student perceived value is not only related to the quality of education but also to the overall learning experience [45]. This finding aligns with [28], who emphasized that student satisfaction is significantly influenced by the perceived value provided by educational institutions. The finding corroborating the earlier research, which showed that students who perceive high value from their educational experience are more likely to recommend the institution to others [37]. The results of this study also underscore that student perceived value mediates the effect of technology support on student satisfaction. In the era of industrial revolution, which impacts the education sector as well, technology support has become essential in the learning process. Teaching quality is one of the most crucial factors in shaping student perceived value. Students who perceive high-quality teaching, supported by technology, tend to have a higher student perceived value and consequently experience greater satisfaction.

4. Conclusion

This study successfully identified the positive and significant impact of service quality, measured using HESQUAL, on student satisfaction in HEIs. However, the findings indicate that service quality does not have a significant effect on student perceived value. In contrast, technology support was found to have a positive and significant impact on both student perceived value and student satisfaction. These findings emphasize the critical role of service quality in enhancing student satisfaction and suggest that technology support plays a key role in shaping students' perceived value and increasing their satisfaction within HEIs. A practical implication for higher education institutions (HEIs) is that, in the current era of rapid technological advancement, students at public universities in Indonesia appear to perceive technology support as playing a significant role in shaping both student perceived value and student satisfaction. Therefore, a strategic leap is required to accelerate digitalization by strengthening digital classrooms and integrating technology-based learning across the Indonesian higher education system. Future research could analyze the effects of word of mouth and HEI image that may be shaped after student satisfaction is achieved. Since this study was limited to analyzing satisfaction alone, further analysis is needed to determine the long-term effects and implications of student satisfaction on other outcomes.

Acknowledgment

The author would like to express gratitude to Sekolah Pascasarjana Universitas Negeri Semarang for supporting this research.

Declarations

Author contribution : Suwito Eko Pramono (Conceptualization, Investigation, Resources, Writing – Original Draft), Arief Yulianto (Conceptualization, Methodology, Supervision, Writing – Original Draft), Angga Pandu Wijaya (Data Curation, Project Administration, Software, Visualization), Nasrun (Conceptualization, Investigation, Writing – Review & Editing), Boonrat Plangsorn (Methodology, Supervision, Writing – Review & Editing)

Funding statement : This research did not receive external funding

Conflict of interest : The authors declare no conflict of interest.

Additional information : No additional information is available for this paper.

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