

Examining the Effects of Service Quality on Student Satisfaction at the Campus Gym Center

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DOI: <https://doi.org/10.47772/IJRISS.2026.100300469>

Received: 27 March 2026; Accepted: 02 April 2026; Published: 13 April 2026

ABSTRACT

This study examines how service quality influences student satisfaction at the campus gym center. Drawing on the SERVQUAL framework and the campus fitness context, service quality is conceptualized through seven dimensions: tangibility, reliability, responsiveness, assurance, empathy, accessibility, and hygiene and safety. Using survey data from 200 students who had used the campus gym center, the study finds that accessibility, assurance, hygiene and safety, tangibility, and responsiveness had significant positive effects on student satisfaction, whereas reliability and empathy did not. Accessibility emerged as the strongest determinant, indicating that students place particular value on convenience and the extent to which gym services fit their academic routines. The findings contribute to the literature by showing that student satisfaction in campus fitness services is shaped not only by traditional service-quality dimensions, but also by practical conditions related to service usability. In particular, the study highlights the importance of accessibility, hygiene, and safety as meaningful dimensions of service quality in a university fitness setting. From a managerial perspective, the results suggest that campus gym managers should focus not only on facilities but also on operational accessibility, staff professionalism, responsiveness, and environmental quality to improve student satisfaction. Because the study was conducted in a single university and focused only on satisfaction, future research could examine broader outcomes and test the model across multiple institutional settings.

Keywords: Service quality; student satisfaction; campus fitness center; higher education.

INTRODUCTION

Physical inactivity has become an increasingly important concern in higher education because many university students face heavy academic workloads, prolonged screen time, and limited opportunities for regular exercise. Therefore, universities have paid greater attention to sports and fitness facilities as part of broader efforts to support student health and well-being. In this context, campus gym centers are more than recreational spaces; they can function as accessible environments that help students maintain physical fitness, reduce stress, and develop healthier daily habits (Yusof, Popa and Geok, 2018). However, the mere presence of a gym facility does not automatically lead to positive student evaluations. A more important issue is whether students perceive the services as practical, dependable, and well-suited to their daily academic routines.

Service quality has long been recognized as a key determinant of satisfaction in service research (Dugenio-Nadela et al., 2023; Ferreira, 2023). The SERVQUAL framework developed by Parasuraman, Zeithaml and Berry (1988) remains the most influential foundation for conceptualizing service quality through five core dimensions (tangibility, reliability, responsiveness, assurance, and empathy). In the fitness industry, this framework has been widely adopted and extended, as users evaluate not only physical facilities and equipment but also staff behavior, interaction quality, and the overall service environment (Polyakova and Mirza, 2016; Peng and Jaffry, 2025). Recent studies further suggest that service quality in fitness services should be understood as a multidimensional construct shaped by a combination of facility-related, staff-related, and

experiential factors (Ferreira, 2023; Tamanna, 2023). This means that service quality in fitness settings cannot be reduced to equipment or infrastructure alone.

This broader view becomes particularly relevant when service quality is examined across different service contexts. Much of the existing literature has focused on commercial gyms or private fitness clubs, where users are typically adult consumers choosing among competing providers. Campus gym centers operate under rather different conditions. Student users often face tighter schedules, lower financial flexibility, and fewer practical alternatives than customers in commercial fitness markets. As a result, they may evaluate service quality not only in terms of how well it is delivered, but also how easily and comfortably it can be integrated into student life. Prior studies point in this direction. Giao (2018), and Yusof, Popa and Geok (2018) indicate that service-quality perceptions are closely related to users' responses in campus fitness settings, while Khadka and Khadka (2022) found that affordability and location significantly affect customer satisfaction in fitness clubs. These findings suggest that practical service-use conditions may become especially important when users have limited flexibility.

At the same time, the literature strongly supports the general relationship between service quality and satisfaction in fitness services. Users are more likely to feel satisfied when they perceive a fitness service as well-equipped, dependable, responsive, professionally delivered, and supportive (Pradeep, Vadakepat and Rajasenan, 2020; Rosete, 2022; Sevilmış et al., 2022). However, it is not strongly clear which dimensions of service quality are most influential in shaping satisfaction within a specific service context. This issue is especially important for campus gym services, where students' evaluations may depend not only on traditional service dimensions, but also on whether the service is accessible, clean, safe, and compatible with academic life. Although research on fitness services has expanded in recent years, studies specifically examining service quality and student satisfaction in campus gym centers remain limited, particularly in developing-country contexts. This gap is important because students in university settings are not simply consumers of a commercial service; they are also members of an academic community whose service use is embedded in class schedules, campus routines, mobility constraints, and budget considerations. Therefore, findings from private gyms may not fully explain how students evaluate service quality in a campus gym center. This issue is particularly relevant in Vietnam, where empirical research on service quality and student satisfaction in university fitness facilities remains scarce.

Building on these gaps, the present study examines how service quality affects student satisfaction at the campus gym center. Specifically, service quality is conceptualized in terms of seven dimensions: tangibility, reliability, responsiveness, assurance, empathy, accessibility, and hygiene and safety. The study addresses three research questions: (1) Which dimensions of service quality significantly influence student satisfaction at the campus gym center? (2) Which dimensions exert the strongest influence on student satisfaction? (3) Do context-relevant dimensions such as accessibility, and hygiene & safety provide additional explanatory value beyond the traditional service-quality dimensions? By addressing these questions, the study contributes to the literature by extending service-quality research to the underexplored context of campus fitness services and by offering practical guidance for improving gym services in ways that better align with student needs and constraints.

LITERATURE REVIEW

Service quality in fitness services and campus fitness settings

Service quality is one of the most established concepts in service research because it reflects users' evaluation of how well a service provider meets or exceeds their expectations. The SERVQUAL framework proposed by Parasuraman, Zeithaml and Berry (1988) remains the most influential foundation in this area, conceptualizing service quality through five dimensions: tangibility, reliability, responsiveness, assurance, and empathy. These dimensions have also been widely applied in the fitness industry because users evaluate both the physical conditions of the service and the way it is delivered by staff (Polyakova and Mirza, 2016; Ferreira, 2023; Peng and Jaffry, 2025). However, the fitness-service literature also suggests that service quality should not be treated as a fixed or purely technical construct. It is a multidimensional and context-dependent concept shaped by a combination of physical, interpersonal, and experiential factors. Ferreira (2023) identifies a broad range of determinants associated with customer satisfaction in fitness centers, including facility quality, staff quality,

price, supporting services, service assurance, and customer relations. Similarly, Jorge Mario and Victor Alfonso (2023) show that the literature treats service quality in gyms as a broad construct encompassing not only equipment and infrastructure but also operational and relational dimensions. Tamanna (2023) further argues that users evaluate fitness services based on a combination of workout facilities, ambiance, responsiveness, trustworthiness, convenience, sincerity, and overall service comfort. These studies suggest that service quality in fitness services is broader than conventional operational performance and cannot be reduced to a narrow evaluation of physical facilities. Importantly, this stream of research also implies that service quality extends beyond service delivery performance to include the conditions that enable or constrain service use. In this context, service quality can be understood not only in terms of how well a service is performed, but also in terms of how accessible, usable, and psychologically comfortable it is for users in a certain context.

This broader view is especially relevant when the service context changes. Much of the existing literature has been developed in commercial gyms or private fitness clubs, where users are typically adult consumers choosing among competing providers. Campus gym services, however, are embedded in students' academic schedules, mobility patterns, and financial constraints. As a result, service quality in a campus setting may be evaluated not only by how well the service is delivered, but also by how easily and comfortably it can be integrated into student life. Yusof, Popa and Geok (2018) showed that perceptions of service quality are important in shaping user responses in campus fitness centers, while Khadka and Khadka (2022) found that affordability and location significantly influence satisfaction in fitness clubs. However, existing service-quality models do not sufficiently capture usability and risk-related dimensions, particularly in constrained-use environments such as campus fitness settings. This creates a theoretical gap, particularly in constrained-use environments such as university settings, where the feasibility of accessing and using a service may be as important as the quality of service delivery. These findings suggest that, in the context of campus gym services, dimensions such as accessibility and hygiene & safety are not merely supplementary operating conditions; they may also represent meaningful components of perceived service quality. This position aligns with Polyakova and Mirza's (2016) argument that service-quality models in the fitness industry should be adapted to the realities of the service context rather than transferred mechanically across contexts.

Building on this perspective, the present study conceptualizes accessibility as a usability-oriented dimension of service quality, reflecting the extent to which a service can be easily accessed, scheduled, and integrated into users' daily routines. Accessibility reduces time and effort costs associated with service use, thereby enhancing perceived value and facilitating more consistent engagement. In addition, this study explicitly incorporates hygiene and safety as a distinct dimension of service quality. In shared-use environments such as fitness centers, users are exposed to potential physical and health-related risks, including equipment-related injuries and hygiene concerns. Therefore, service evaluation is shaped not only by functional performance but also by perceived risk. Hygiene and safety can be understood as a risk-reduction dimension of the servicescape, influencing users' psychological comfort, trust, and overall satisfaction (Attri, Bhagwat, and Reardon, 2024). This approach is particularly noticeable in the post-pandemic context, where cleanliness and safety have become critical signals of service reliability and organizational competence. As a result, users may interpret a clean and safe environment as an indicator of overall service quality, rather than solely a background condition.

Service quality and student satisfaction

The positive relationship between service quality and satisfaction is among the most consistently supported in service research, and similar evidence has been reported in the fitness industry. In general, users are more likely to feel satisfied when they perceive a fitness service as well-equipped, dependable, responsive, professionally delivered, and supportive (Pradeep, Vadakepat and Rajasenan, 2020; Rosete, 2022; Sevilmiş et al., 2022). However, what remains less clear is which dimensions of service quality become most influential in shaping satisfaction within a specific service context.

In particular, existing studies provide limited insight into how extended dimensions of service quality, such as accessibility, hygiene and safety, operate as core determinants of satisfaction, rather than as marginal or background factors. This limitation is especially important in campus gym services, where students' evaluations are shaped by structural constraints related to time availability, mobility, and resource access. Because student

users experience the service under constraints related to academic schedules, campus routines, and limited resources, their satisfaction may be shaped not only by traditional service dimensions such as tangibility, reliability, responsiveness, assurance, and empathy, but also by context-relevant dimensions such as accessibility, hygiene and safety. Although existing studies strongly support the general relationship between service quality and satisfaction, they provide less direct evidence on how an extended set of service-quality dimensions operates in a university fitness environment.

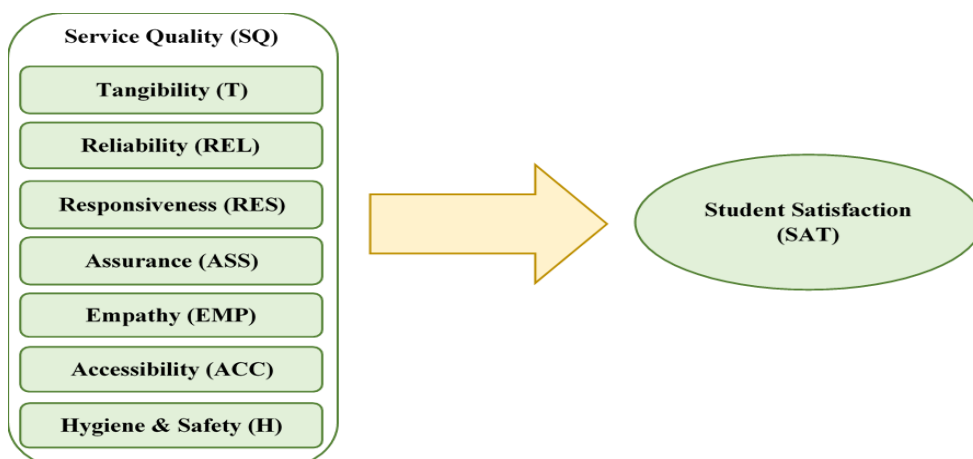
Accordingly, this study extends the SERVQUAL framework by incorporating usability (accessibility) and risk-related environmental conditions (hygiene and safety) to capture service quality in campus fitness settings better. This unresolved issue provides the conceptual basis for the present study, which examines the effects of tangibility, reliability, responsiveness, assurance, empathy, accessibility, and hygiene on student satisfaction at the campus gym center.

Conceptual framework and hypotheses

Based on the reviewed literature, this study proposes a conceptual framework in which service quality influences student satisfaction at the campus gym center. In this study, service quality is conceptualized through seven dimensions: tangibility, reliability, responsiveness, assurance, empathy, accessibility, and hygiene and safety. The first five dimensions are derived from the SERVQUAL framework, while accessibility and hygiene & safety are included to better reflect the practical realities of campus-based fitness services. This extended view is supported by prior fitness-service research, which suggests that users evaluate quality not only through facilities and staff performance, but also through service convenience, environmental conditions, and the overall usability of the service in a particular context (Parasuraman, Zeithaml and Berry, 1988; Polyakova and Mirza, 2016; Ferreira, 2023; Tamanna, 2023; Jang and Baek, 2024; Kim and Kim, 2024). Together, these dimensions provide a contextually appropriate framework for explaining student satisfaction at the campus gym center (Figure 1) and examining the following hypotheses:

- H1: Tangibility positively affects student satisfaction at the campus gym center.
- H2: Reliability positively affects student satisfaction at the campus gym center.
- H3: Responsiveness positively affects student satisfaction at the campus gym center.
- H4: Assurance positively affects student satisfaction at the campus gym center.
- H5: Empathy positively affects student satisfaction at the campus gym center.
- H6: Accessibility positively affects student satisfaction at the campus gym center.
- H7: Hygiene and safety positively affect student satisfaction at the campus gym center.

Figure 1. Conceptual Framework



METHODOLOGY

Research context

This study was conducted at the campus gym center of Vietnam National University of Agriculture (VNUA), a large public university in Hanoi, Vietnam. VNUA was considered an appropriate research setting because its student population is academically and geographically diverse, representing different majors, academic years, and residential backgrounds. The campus gym center offers students access to strength training and general fitness activities, and plays a supporting role in promoting healthier lifestyles within the university environment. This context is particularly relevant because many VNUA students come from rural and mountainous areas, where access to formal fitness facilities may be more limited. In such a setting, the university gym serves not only as a place for exercise but also as an important on-campus health support resource.

Sampling and data collection

The participants in the study were students who had used the campus gym center at VNUA. The final sample included 200 valid responses, which was considered adequate for the planned analyses, including reliability testing, exploratory factor analysis, and multiple regression. Data were collected over two months, from September to December, 2025, using a structured questionnaire. The survey was distributed through two channels: online via Google Forms and directly to students at the gym center. Participation was voluntary, and respondents were informed that the information collected would be used solely for academic purposes. Before the main survey, the questionnaire was reviewed and refined to improve clarity and suitability for the campus fitness context.

Table 1 summarizes the demographic characteristics of the respondents. Of the 200 participants, 104 (52.0%) were male, and 96 (48.0%) were female. In terms of academic year, the sample consisted of 40 first-year students (20.0%), 40 second-year students (20.0%), 48 third-year students (24.0%), and 72 fourth-year students (36.0%). The respondents also represented four major fields of study, including agriculture (21.0%), economics (29.0%), natural science (24.0%), and humanities and social science (26.0%). Regarding geographical background, 26.0% of respondents came from urban areas, 50.0% from rural areas, and 24.0% from mountainous areas. In terms of gym usage frequency, the largest group reported using the facility one to three times per week (59.0%), followed by four times or more per week (22.0%), and less than once a week (19.0%). Overall, the sample reflects the main user groups of the campus gym center.

Table 1. Demographic characteristics of respondents (N=200)

Variable	Category	Frequency	Percentage (%)
Gender	Male	104	52.0
	Female	96	48.0
Academic year	The 1 st year	40	20.0
	2 nd year	40	20.0
	3 rd year	48	24.0
	4 th year	72	36.0
Major of study	Agriculture	42	21.0
	Economic	58	29.0

	Natural science	48	24.0
	Humanities and social science	52	26.0
Geographical background	Urban	52	26.0
	Rural	100	50.0
	Mountainous	48	24.0
Frequency of use	Less than once a week	38	19.0
	1-3 times per week	118	59.0
	4 times or more per week	44	22.0

Measurement instruments

Data were collected using a structured questionnaire designed to assess service quality and student satisfaction in the campus gym. All items were rated on a five-point Likert scale, ranging from 1 = strongly disagree to 5 = strongly agree. The questionnaire consisted of two main parts. The first part collected respondents’ background information, including gender, academic year, major of study, geographical background, and frequency of gym use. The second part measured the study constructs. Service quality was operationalized through seven dimensions: tangibility, reliability, responsiveness, assurance, empathy, accessibility, and hygiene and safety. Student satisfaction was measured as students’ overall evaluation of their experience with the campus gym center.

Table 2 reports the descriptive statistics of the variables. Overall, respondents evaluated the campus gym center as moderate to relatively positive. Among the seven service-quality dimensions, tangibility received the highest mean score (M = 3.84, SD = 0.64), followed by responsiveness (M = 3.76, SD = 0.67) and empathy (M = 3.69, SD = 0.65). In contrast, accessibility recorded the lowest mean (M = 3.21, SD = 0.79), followed by hygiene (M = 3.34, SD = 0.72). These results suggest that while students tended to evaluate the physical facilities and staff-related support relatively positively, there was more room for improvement in the convenience and operational conditions of service use. The mean student satisfaction score was 3.67 (SD = 0.69), indicating a generally positive but not optimal level of satisfaction.

Table 2. Descriptive statistics

Construct	Mean	SD
Tangibility	3.84	0.64
Reliability	3.48	0.70
Responsiveness	3.76	0.67
Assurance	3.55	0.68
Empathy	3.69	0.65
Accessibility	3.21	0.79
Hygiene	3.34	0.72
Student Satisfaction	3.67	0.69

Data analysis

The collected data were analyzed using SPSS 20.0. The analysis followed several steps. First, descriptive statistics were used to summarize respondents' demographic characteristics and the distribution of the main variables. Second, Cronbach's alpha was employed to examine the internal consistency of each measurement scale. Third, exploratory factor analysis (EFA) was conducted to assess the factor structure of the observed variables and to confirm whether the measurement items loaded onto the expected dimensions. Finally, multiple regression analysis was applied to test the effects of the seven service-quality dimensions on student satisfaction. Following this procedure, the study aimed to identify which dimensions significantly influenced student satisfaction and which dimensions exerted the strongest effects in the campus gym context.

RESULTS

Group differences across student characteristics

Additional analysis showed that student satisfaction differed across usage-frequency groups in Table 3. Students who used the fitness center four times or more per week reported the highest satisfaction level ($M = 3.92$), followed by those using it one to three times per week ($M = 3.68$) and those using it less than once per week ($M = 3.41$). The difference was statistically significant ($F = 12.884, p < 0.001$), suggesting that more frequent users tended to evaluate the service more positively. Some differences were also observed across geographical background groups, though less marked.

Table 3. Group differences in student satisfaction

Grouping variable	Category	Satisfaction (Mean)	Test statistic	Sig.
Usage frequency	Less than once/week	3.41	F = 12.884	< 0.001**
	1-3 times/week	3.68		
	More than 4times/week	3.92		
Geographical background	Urban	3.58	F = 3.294	0.039*
	Rural	3.69		
	Mountainous	3.73		
Gender	Male	3.70	t = 0.842	0.401
	Female	3.63		

Note: * $p < 0.050$; ** $p < 0.001$.

Reliability analysis

The internal consistency of the measurement scales was assessed using Cronbach's Alpha. All retained constructs demonstrated acceptable to good reliability. Alpha values ranged from 0.675 to 0.845 across the service-quality dimensions, while student satisfaction achieved an alpha of 0.805. Overall, these results indicate that the scales were sufficiently reliable for subsequent analysis. Although responsiveness had the lowest alpha coefficient (0.675), it remained acceptable for exploratory research.

Table 4. Reliability analysis

Indicators	Items	Cronbach's Alpha	Corrected Item-Total Correlation
Tangibility	3	0.766	0.607
			0.636
			0.555
Reliability	3	0.845	0.730
			0.743
			0.656
Responsiveness	3	0.675	0.547
			0.507
			0.507
Assurance	3	0.755	0.586
			0.585
			0.581
Empathy	3	0.781	0.600
			0.626
			0.628
Accessibility	3	0.794	0.578
			0.646
			0.692
Hygiene & Safety	3	0.814	0.673
			0.669
			0.653
Student satisfaction	3	0.805	0.548
			0.729
			0.704

Exploratory factor analysis

An exploratory factor analysis was conducted on the 21 observed items measuring the seven dimensions of service quality in Table 5. The suitability of the data for factor analysis was confirmed by a Kaiser-Meyer-Olkin

(KMO) value of 0.800 and a statistically significant Bartlett’s Test of Sphericity (Approx. Chi-square = 1663.151, $df = 210$, $p < 0.001$). The EFA results supported a seven-factor structure, and the extracted factors explained 70.866% of the total variance. These results indicate that the proposed dimensions provided a satisfactory representation of service quality in the campus gym context.

Table 5. Total Variance Explained and KMO results

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			KMO and Bartlett’s Test	
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %		
1	5.886	28.030	28.030	5.886	28.030	28.030	KMO	0.800
2	2.471	11.767	39.797	2.471	11.767	39.797		
3	1.591	7.574	47.371	1.591	7.574	47.371		
4	1.481	7.051	54.422	1.481	7.051	54.422	Bartlett’s Test Approx. Chi-square	1663.151
5	1.267	6.033	60.455	1.267	6.033	60.455		
6	1.133	5.396	65.851	1.133	5.396	65.851		
7	1.053	5.015	70.866	1.053	5.015	70.866	df	210
							Sig.	< 0.001

Extraction Method: Principal Component Analysis.

The rotated component matrix, further shown in Table 6, indicated that the observed items clearly loaded onto the expected dimensions. The three reliability items loaded strongly on one factor, the three hygiene and safety items on another, the three accessibility items on a third, the three empathy items on a fourth, the three tangibility items on a fifth, the three assurance items on a sixth, and the three responsiveness items on a seventh. Overall, the rotated structure was consistent with the proposed multidimensional conceptualization of service quality.

Table 6. Rotated Component Matrix^a

	Component						
	1	2	3	4	5	6	7
REL1	0.870						
REL2	0.860						
REL3	0.789						
H3		0.831					
H1		0.772					
H2		0.762					
ACC3			0.856				

ACC2			0.814				
ACC1			0.729				
EMP3				0.837			
EMP2				0.763			
EMP1				0.747			
T3					0.796		
T2					0.781		
T1					0.750		
ASS1						0.776	
ASS2						0.761	
ASS3						0.738	
RES2							0.776
RES3							0.748
RES1							0.612

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

- a. Rotation converged in 6 iterations.

A separate EFA was then performed for the three items measuring student satisfaction. The results again confirmed the adequacy of the data with a KMO value of 0.672 and a significance of Bartlett’s Test of Sphericity (Approx. Chi-square = 214.624, df = 3, $p < 0.001$). These findings indicate that the three items were sufficiently correlated to form a single factor. The analysis extracted one factor, which explained 72.106% of the total variance. This result confirms that student satisfaction was measured as a unidimensional construct.

In conclusion, the results provide strong support for the measurement structure used in this study. First, all constructs achieved acceptable internal consistency, indicating that the items within each scale measured the same underlying concept in a reasonably stable manner. Second, the EFA results confirmed that service quality in the campus gym context was multidimensional and could be meaningfully represented through the seven proposed dimensions: tangibility, reliability, responsiveness, assurance, empathy, accessibility, and hygiene and safety. Third, student satisfaction emerged as a clear one-factor construct, supporting its role as the dependent variable in the analytical model.

Multiple regression analysis and hypothesis testing

To test the proposed hypotheses, a multiple regression analysis was conducted with student satisfaction as the dependent variable and the seven dimensions of service quality as the independent variables. The regression model was statistically significant ($F = 28.893$, $p < 0.001$), indicating that the selected service-quality dimensions jointly explained a substantial proportion of variance in student satisfaction. The model produced an R of 0.716, an R-square of 0.513, and an adjusted R-square of 0.405, indicating that approximately 51.3% of the variance in

student satisfaction was explained by the model (Table 7-8). The Durbin-Watson statistic was 1.358, suggesting no serious autocorrelation problem in the residuals.

Table 7. Model summary^b

Model	R	R ²	Adjusted R ²	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R ² Change	F Change	df 1	df2	Sig. Change	
1	0.716 ^a	0.513	0.405	0.86253	0.513	28.893	7	192	0.000	1.358

^a. Predictors: (Constant), H, ACC, EMP, ASS, RES, REL, T

^b. Dependent Variable: SAT

Table 8. ANOVA^a results

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	93.131	7	13.304	28.893	.000 ^b
	Residual	88.411	192	.460		
	Total	181.542	199			

^a. Dependent Variable: SAT

^b. Predictors: (Constant), H, ACC, EMP, ASS, RES, REL, T

Among the seven predictors, accessibility was the strongest determinant of student satisfaction ($B = 0.265$, $\beta = 0.277$, $t = 4.327$, $p < 0.001$). Assurance ($B = 0.186$, $\beta = 0.195$, $t = 3.050$, $p = 0.003$), hygiene and safety ($B = 0.181$, $\beta = 0.189$, $t = 2.954$, $p = 0.004$), tangibility ($B = 0.161$, $\beta = 0.169$, $t = 2.633$, $p = 0.009$), and responsiveness ($B = 0.146$, $\beta = 0.152$, $t = 2.380$, $p = 0.018$) also had significant positive effects on student satisfaction. By contrast, reliability ($B = 0.041$, $\beta = 0.043$, $t = 0.676$, $p = 0.500$) and empathy ($B = 0.091$, $\beta = 0.095$, $t = 1.491$, $p = 0.138$) were not statistically significant. The collinearity statistics showed no evidence of multicollinearity, with all tolerance values equal to 1.000 and all VIF values equal to 1.000 (Table 9). Finally, five of the seven hypotheses were supported by the regression results in Table 10. Specifically, H1, H3, H4, H6, and H7 were supported, while H2 and H5 were not supported.

Table 9. Multiple regression results for student satisfaction

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	β			Tolerance	VIF
1	(Constant)	2.958	0.061		48.505	0.000		
	T	0.161	0.061	0.169	2.633	0.009	1.000	1.000
	REL	0.041	0.061	0.043	0.676	0.500	1.000	1.000

RES	0.146	0.061	0.152	2.380	0.018	1.000	1.000
ASS	0.186	0.061	0.195	3.050	0.003	1.000	1.000
EMP	0.091	0.061	0.095	1.491	0.138	1.000	1.000
ACC	0.265	0.061	0.277	4.327	0.000	1.000	1.000
H	0.181	0.061	0.189	2.954	0.004	1.000	1.000

Table 10. Summary of hypothesis testing

Hypothesis	Statement	Sig.	Result
H1	Tangibility positively affects student satisfaction.	0.009*	Supported
H2	Reliability positively affects student satisfaction.	0.500	Not supported
H3	Responsiveness positively affects student satisfaction.	0.018*	Supported
H4	Assurance positively affects student satisfaction.	0.003*	Supported
H5	Empathy positively affects student satisfaction.	0.138	Not supported
H6	Accessibility positively affects student satisfaction.	0.000**	Supported
H7	Hygiene and safety positively affect student satisfaction.	0.004*	Supported

Note: *p<0.05, **p<0.001

DISCUSSION

This study shows that accessibility, assurance, hygiene and safety, tangibility, and responsiveness had significant positive effects on student satisfaction, whereas reliability and empathy did not. Overall, the findings indicate that student satisfaction at the campus gym center is shaped by both traditional service-quality dimensions and context-relevant conditions, with accessibility exerting the greatest influence. More importantly, the results provide empirical support for the argument that service quality in campus fitness settings extends beyond service performance to encompass dimensions of usability and risk-reduction conditions. The strong effect of accessibility is particularly noteworthy. Consistent with the theoretical framing of this study, accessibility functions as a usability-oriented dimension of service quality, reflecting the extent to which the service can be easily accessed, scheduled, and integrated into students’ daily routines. This finding aligns with Khadka and Khadka (2022), who highlight the role of convenience factors such as affordability and location, and supports Ferreira (2023) conclusion that satisfaction depends not only on core service delivery but also on supporting conditions. However, the present study goes further by demonstrating that accessibility is not only a contextual factor but a central mechanism through which service quality is evaluated. By reducing time and effort costs, accessibility enhances perceived value and facilitates more consistent engagement, thereby exerting a stronger influence on satisfaction than several traditional SERVQUAL dimensions. In this sense, accessibility should be understood not as a marginal operational condition, but as a core component of service quality that captures the compatibility between service provision and users’ time-space constraints. This issue reinforces the central role of usability in shaping service evaluations in constrained environments.

While usability is critical, interpersonal factors also play an important role. The significant effect of assurance indicates that students are more satisfied when staff are perceived as knowledgeable, trustworthy, and capable of creating confidence during service use. This finding is consistent with Ferreira (2023), Tamanna (2023), and Peng and Jaffry (2025). In the university context, where many users may have limited prior experience, assurance contributes not only through technical competence but also by reducing uncertainty and enhancing psychological comfort.

In addition to usability and interaction quality, environmental conditions are also critical. The positive effects of tangibility, hygiene and safety reinforce the importance of the servicescape in fitness settings (Tae Kim et al., 2016; Jang and Baek, 2024). More importantly, the significant effect of hygiene and safety supports its conceptualization as a risk-reduction dimension of the servicescape. Consistent with Attri, Bhagwat, and Reardon (2024), the findings indicate that students evaluate the gym environment not only based on physical attributes but also on its ability to minimize perceived physical and health-related risks. Hygiene and safety enhance satisfaction by fostering feelings of security, trust, and psychological comfort in a shared-use environment. Thus, they operate as active determinants of service evaluation rather than passive background conditions, highlighting the importance of risk-reduction mechanisms. The significance of responsiveness indicates that prompt assistance and timely support matter to students in their evaluations of the gym service. This finding is broadly consistent with the conclusions of Eskiler and Safak (2022), Kim and Kim (2024), which highlight the importance of interaction quality and customer experience in fitness services. In the campus gym context, responsiveness may also help reduce uncertainty and facilitate smoother service use, particularly for students with limited experience, thereby reinforcing its role in enhancing overall usability.

In contrast, reliability and empathy did not have significant effects. One explanation is that reliability functions as a baseline expectation rather than a differentiating factor. Students may take consistent service delivery for granted and instead prioritize dimensions that directly affect usability and perceived risk, such as accessibility and assurance. A similar interpretation applies to empathy. While individualized attention is desirable, it may be less influential than practical convenience and functional support in a time-constrained environment. These findings suggest that the relative importance of service-quality dimensions is context-dependent, with usability and risk-related dimensions becoming more prominent in shared-use settings.

This study makes several theoretical contributions. First, it strengthens the established view that service quality is a key determinant of satisfaction in fitness services (Pradeep, Vadakepat and Rajasenan, 2020; Rosete, 2022; Sevilmiş et al., 2022), while showing that its influence is uneven across dimensions. Second, it supports the argument that service quality is context-sensitive (Polyakova and Mirza, 2016). More importantly, the study extends the SERVQUAL framework by demonstrating that accessibility functions as a usability-oriented dimension and hygiene and safety as a risk-related servicescape dimension, both of which play central roles in shaping satisfaction in campus fitness services. By incorporating these dimensions, the study offers a more context-sensitive and theoretically grounded conceptualization of service quality in environments constrained by time, mobility, and shared usage. Third, the findings provide empirical support for explicitly including hygiene and safety in service-quality models for shared exercise spaces. Generally, the study contributes by shifting the conceptualization of service quality from a purely performance-based framework to a more comprehensive model that incorporates usability and risk-related environmental conditions.

From a practical perspective, improving student satisfaction is not simply a matter of upgrading facilities. Accessibility emerged as the strongest predictor, suggesting that managers should prioritize service usability by optimizing operating hours, simplifying access procedures, and ensuring compatibility with students' schedules. The significant effect of assurance highlights the importance of staff training to build trust and confidence. In addition, maintaining high standards of hygiene and safety is essential not only for operational reasons but also to reduce perceived risk and enhance psychological comfort. Responsiveness should also be ensured to ensure a smooth service experience. Overall, campus gym managers should adopt a comprehensive service-improvement strategy that integrates physical quality, staff competence, responsiveness, and accessibility, rather than focusing only on infrastructure. Collectively, these findings suggest that service quality in campus fitness settings is best understood as a combination of performance, usability, and risk-reduction mechanisms.

CONCLUSION

This study examined how seven dimensions of service quality affect student satisfaction at the campus gym center. The findings show that accessibility, assurance, hygiene and safety, tangibility, and responsiveness had significant positive effects on student satisfaction, whereas reliability and empathy did not. Among these predictors, accessibility emerged as the strongest factor, suggesting that students place particular value on the convenience and compatibility of gym services with their academic routines. These findings contribute to the

literature by confirming that service quality is an important predictor of satisfaction in fitness services while also showing that its most influential dimensions may vary by context. More specifically, the study highlights that student satisfaction in campus gym settings is shaped not only by traditional service-quality attributes, but also by practical conditions related to service usability. In this regard, the findings support the inclusion of accessibility and hygiene and safety as meaningful dimensions in the study of campus fitness services. From a practical perspective, the study suggests that campus gym managers should look beyond facilities and equipment alone. Student satisfaction appears to depend more strongly on accessibility, staff competence, responsiveness, and a clean and safe environment. Improving these aspects may help enhance students' overall service experience. This study has several limitations. It was conducted in a single university and used a cross-sectional design, which may limit the generalizability of the findings. In addition, the model focused only on student satisfaction and did not include other potentially relevant constructs or outcomes, such as perceived value, loyalty, or continued use. Future research could address these limitations by examining multiple university settings, using longitudinal data, and extending the model to include broader psychological and behavioral outcomes.

ACKNOWLEDGE

Authors' specific contribution: Introduction (Do Thi Hong Nhung - D.T.H.N), Methodology (D.T.H.N, Dang Duc Hoan - D.D.H), Results (D.T.H.N, D.D.H), Discussion and Conclusions (D.T.H.N, D.D.H)

Funding: None was provided for this research.

Informed consent study participants: Informed consent was obtained.

Conflict of interest: The authors report no conflicts of interest.

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