

# Presenting a Model for Explaining the Factors Affecting Student Satisfaction at Islamic Azad University

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## ABSTRACT

Achieving student satisfaction is among the key concerns of the higher education system in the country, yet it has received limited attention from researchers. Accordingly, the present study was conducted with the aim of identifying the factors affecting student satisfaction at Islamic Azad University across the country. This applied study collected data using a descriptive–survey method. The research approach is mixed-methods; in the qualitative phase, following preliminary library-based reviews, the factors influencing student satisfaction at Islamic Azad University nationwide were validated by experts using the Delphi method and a researcher-developed questionnaire. The statistical population in this phase consisted of 15 faculty members and expert managers with specialized knowledge from the Islamic Azad University units of Science and Research, Tehran North, Tehran South, and Kashan, who were selected through non-probability judgmental sampling. Subsequently, in the quantitative phase of the study, confirmatory factor analysis was conducted using SmartPLS 3 software to assess the validity of the proposed model. The statistical population in this phase included master's and doctoral students at the Islamic Azad University units of Science and Research and Kashan, from whom 381 individuals were selected as the statistical sample using stratified random sampling. Ultimately, the results indicated that six categories of factors—educational services, research services, facilities and infrastructure, electronic services, administrative services, and welfare services—significantly affect student satisfaction at Islamic Azad University nationwide.

**Keywords:** Student satisfaction, Islamic Azad University, Delphi method, confirmatory factor analysis

## Introduction

In contemporary higher education systems, student satisfaction has emerged as a central indicator of institutional effectiveness, educational quality, and long-term sustainability. Universities are no longer evaluated solely on academic outputs or research productivity; rather, they are increasingly assessed through multidimensional performance frameworks that place students' perceptions, experiences, and satisfaction at the core of institutional accountability. This shift reflects broader transformations in higher education governance, where competition, globalization, technological change, and stakeholder-oriented management models have intensified the need to understand and systematically manage student satisfaction. Recent empirical studies consistently demonstrate that



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student satisfaction is closely associated with critical outcomes such as academic engagement, persistence, loyalty, advocacy intentions, psychological well-being, and institutional reputation (1-3).

From a theoretical perspective, student satisfaction is a complex and multidimensional construct shaped by academic, administrative, technological, social, and psychological factors. Rather than being a unidimensional emotional response, satisfaction reflects a cumulative evaluation of students' interactions with various institutional subsystems over time. These include instructional quality, faculty performance, academic services, learning environments, digital infrastructure, administrative responsiveness, and welfare support systems. Research conducted across diverse educational contexts confirms that satisfaction is influenced not only by service quality but also by students' expectations, personal characteristics, cultural values, and perceived institutional commitment (4-6). Consequently, identifying the underlying dimensions and mechanisms that shape student satisfaction requires an integrative and empirically grounded analytical approach.

One of the most robust streams of research in this domain focuses on the relationship between educational service quality and student satisfaction. Service quality models adapted from marketing and service management literature have been widely applied to higher education, emphasizing reliability, responsiveness, assurance, empathy, and tangibility as core determinants of satisfaction. Empirical evidence from different countries indicates that high-quality academic and administrative services significantly enhance students' satisfaction and loyalty, while poor service delivery undermines trust and institutional attachment (3, 5, 7). Moreover, perceived service quality has been shown to indirectly affect students' behavioral intentions, such as retention and positive word-of-mouth, through satisfaction and institutional trust (2, 4).

Alongside traditional service quality dimensions, recent research highlights the growing importance of digital and technological factors in shaping student satisfaction. The rapid expansion of online learning, blended education, and virtual academic services—accelerated by global disruptions such as the COVID-19 pandemic—has fundamentally altered students' learning experiences. Studies examining online and blended learning environments reveal that digital literacy, platform usability, interaction quality, and technological support play a decisive role in determining students' satisfaction with virtual education (8-10). Inadequate digital infrastructure or technostress can negatively affect students' academic performance, well-being, and overall satisfaction, underscoring the need for institutions to strategically manage electronic services as an integral component of educational quality (11, 12).

Beyond academic and technological dimensions, student satisfaction is also deeply connected to psychological and affective factors. Recent interdisciplinary research demonstrates that satisfaction is intertwined with students' mental health, life satisfaction, motivation, engagement, and psychological capital. For example, studies among university and medical students show that higher levels of psychological well-being, faith-based coping resources, and personal resilience are positively associated with satisfaction, while psychological distress and burnout reduce satisfaction levels (12-14). Furthermore, academic engagement and learning motivation have been identified as key mediators between institutional conditions and satisfaction, suggesting that satisfaction emerges through dynamic interactions between individual and contextual factors (15-17).

Another important line of inquiry emphasizes the role of institutional identity, trust, and image in shaping student satisfaction. Students' identification with their university and their perception of institutional credibility influence how they interpret academic experiences and respond to service quality. Empirical findings indicate that strong student–university identification enhances satisfaction, trust, and advocacy intentions, while weak institutional attachment increases dropout intentions and disengagement (1, 18). Institutional image has also been shown to indirectly affect

satisfaction and loyalty by shaping students' expectations and emotional bonds with the university (2). These findings highlight that satisfaction is not merely a function of service delivery but is embedded within broader relational and symbolic dimensions of higher education.

Despite the growing body of international research on student satisfaction, several gaps remain evident. First, many studies focus on isolated dimensions—such as online learning, academic engagement, or service quality—without offering an integrated model that captures the combined effects of educational, research, administrative, electronic, infrastructural, and welfare services. Second, much of the existing literature relies on single-method quantitative designs, limiting the depth of conceptual exploration and the contextual validity of measurement models. Third, findings derived from Western or East Asian higher education systems may not be directly transferable to other institutional and cultural contexts, particularly those characterized by hybrid governance structures and diverse student populations (6, 19).

In this regard, universities operating within large, multi-campus systems face unique challenges in managing and evaluating student satisfaction. Variations in academic resources, administrative capacity, technological infrastructure, and campus culture can lead to heterogeneous student experiences, complicating efforts to design unified satisfaction enhancement strategies. Structural equation modeling studies demonstrate that satisfaction mechanisms may differ significantly across institutional subsystems, necessitating context-sensitive and empirically validated models (20, 21). Therefore, developing a comprehensive and contextually grounded framework for understanding student satisfaction remains a critical research priority.

Moreover, recent methodological advances underscore the value of mixed-method approaches in satisfaction research. Combining qualitative techniques—such as expert-based Delphi studies—with quantitative modeling allows researchers to capture both theoretical consensus and empirical validation. This approach enhances construct validity, ensures contextual relevance, and facilitates the development of robust measurement models that reflect the complexity of student satisfaction as a multidimensional phenomenon (6, 20). Such integrative designs are particularly suitable for higher education systems undergoing rapid transformation and diversification.

In light of these considerations, the present study responds to the need for a comprehensive, empirically validated model that explains the key factors influencing student satisfaction within a large university system. By integrating insights from service quality theory, digital education research, psychological well-being studies, and institutional relationship frameworks, this study seeks to provide a holistic understanding of student satisfaction grounded in both expert consensus and student perceptions. The study employs a mixed-method design, utilizing expert judgment to identify critical satisfaction dimensions and structural equation modeling to test the relationships among constructs, thereby contributing to both theory and practice in higher education management.

Accordingly, the aim of this study is to develop and validate a comprehensive model explaining the factors affecting student satisfaction in the university context through a mixed-method approach combining expert-based Delphi analysis and structural equation modeling.

## Methods and Materials

The present study is applied in nature, and the data were collected using a descriptive–survey approach. The research strategy adopted in this study is a mixed-methods design. Specifically, following preliminary library-based reviews and semi-structured interviews, the factors affecting student satisfaction at Islamic Azad University were identified through the Delphi method, which is one of the qualitative research approaches. A researcher-developed

questionnaire was used to elicit expert opinions, and ultimately, through four iterative Delphi rounds, consensus was achieved among the experts regarding the model fit, components, and factor composition. The statistical population in this phase of the study consisted of 15 faculty members and expert managers with relevant expertise from Islamic Azad University units of Science and Research, Tehran North, Tehran South, and Kashan, who were selected using non-probability judgmental sampling. Subsequently, in order to test the final research model, a researcher-developed questionnaire was distributed among 381 master's and doctoral students at the Islamic Azad University units of Science and Research and Kashan, who were selected using stratified random sampling. Finally, the collected data were analyzed using confirmatory factor analysis with SmartPLS 3 software.

## Findings and Results

The research findings are presented in two sections: model validation using the Delphi method and testing of the final model using confirmatory factor analysis.

The first step in the Delphi method is the formation of the expert panel and the procedure for selecting its members. In this study, 15 faculty members and expert managers with specialized knowledge from the Islamic Azad University units of Science and Research, Tehran North, Tehran South, and Kashan were selected through non-probability judgmental sampling. The demographic characteristics of the selected panel members are presented in Table 1.

**Table 1. Demographic Characteristics of Delphi Panel Members**

Academic Experts (University Faculty)				Non-Academic Experts		
Educational Degree	Academic Rank	Number	Percentage (%)	Educational Degree	Number	Percentage (%)
PhD	Professor	1	66.6	PhD	5	33.33
	Associate Professor	2	13.33	Master's	3	66.26
	Assistant Professor / Instructor	2	13.33	Bachelor's	1	6.66
	Total	6	40	Total	9	60

Subsequently, a questionnaire was developed and administered to the panel members in order to determine the importance of each dimension, component, and indicator of the research model. In the first round, panel members were asked to express their opinions on 6 variables, 23 components, and 108 indicators of the model that had been extracted from previous studies. In this round, panel members identified many of the factors as having high or very high influence (with mean impact values greater than or equal to 4) in the model design. In addition, Kendall's coefficient of concordance was calculated as 0.267 in this round.

In the second round, all factors, along with the mean ratings from the first round and each expert's prior responses, were redistributed to all panel members. In this round, the panel members considered all factors to be effective in the student satisfaction model at Islamic Azad University nationwide. Kendall's coefficient of concordance for the 108 model factors in this round was 0.533.

In the third round, the same procedure was repeated while considering the results of the second round. Kendall's coefficient of concordance in this round reached 0.728, indicating strong consensus among the experts regarding the proposed concepts and factors.

Finally, in the fourth round of the Delphi method, all variables retained from the third round were included. Kendall's coefficient of concordance in this round was 0.741, which did not show a substantial increase compared

to the third round. Therefore, the Delphi process was considered complete after the fourth round. The results obtained from the four Delphi rounds are presented in Table 2.

**Table 2. Comparison of the Results of the Consensus Indices across the Four Delphi Rounds  
(Kendall's Coefficient of Concordance (W))**

Dimension	Factor	Round 1	Round 2	Round 3	Round 4
Educational Services	Quality of educational content	0.250	0.536	0.841	0.857
	Faculty performance	0.219	0.503	0.806	0.930
	Quality of educational planning	0.307	0.612	0.922	0.822
	Quality of academic assessment	0.259	0.561	0.799	0.818
Research Services	Performance of supervisors and advisors	0.160	0.472	0.765	0.769
	Quality of library resources	0.435	0.643	0.904	0.915
	Quality of scientific programs	0.397	0.572	0.816	0.823
	Research support	0.418	0.669	0.962	0.970
Facilities and Infrastructure	Quality of educational space	0.421	0.422	0.735	0.753
	Quality of educational facilities and equipment	0.227	0.627	0.901	0.940
	Quality of library space	0.336	0.602	0.927	0.911
Electronic Services	Quality of virtual education	0.352	0.619	0.915	0.956
	Management and support of virtual services	0.256	0.556	0.807	0.837
	Quality of electronic equipment and infrastructure	0.445	0.635	0.938	0.944
Administrative Services	Performance of university administrators	0.315	0.534	0.821	0.852
	Performance of university staff	0.261	0.561	0.869	0.880
	Quality of administrative services	0.183	0.426	0.730	0.777
Welfare Services	Quality of welfare facilities and infrastructure	0.443	0.575	0.873	0.990
	Quality of dormitories	0.264	0.561	0.866	0.880
	Quality of cultural and recreational programs	0.469	0.683	0.983	0.989
	Quality of health and medical services	0.343	0.672	0.968	0.891
	Quality of counseling services	0.163	0.594	0.892	0.912
	Quality of financial services	0.371	0.518	0.820	0.900

In this study, confirmatory factor analysis, which is used to examine the fit of the conceptual model, was conducted in three stages: (1) measurement model fit (to assess the accuracy of the relationships within the model), (2) structural model fit (to examine and interpret the relationships in the structural component of the model), and (3) overall model fit (measurement and structural).

To assess the fit of the measurement model, reliability criteria (including factor loadings, composite reliability, and Cronbach's alpha) and validity criteria (including convergent validity and discriminant validity) of the research constructs were employed.

Factor loadings are used to determine the extent to which measurement indicators (observed variables) are acceptable for measuring latent variables (Abbasi Esfanjani, 2017). Accordingly, if a factor loading is less than 0.40, the relationship is considered weak and is disregarded. If the factor loading falls between 0.40 and 0.60, it is considered acceptable, indicating that the items are appropriate indicators of the model variables; factor loadings greater than 0.60 are regarded as highly desirable.

Composite reliability evaluates the reliability of constructs based on the correlations among their indicators, and its value should exceed 0.70.

Cronbach's alpha is an appropriate measure for evaluating internal consistency (internal reliability), and its value should be greater than 0.70. Table 3 presents the values of factor loadings, composite reliability, and Cronbach's alpha for the constructs of the model.

**Table 3. Results of Factor Loadings, Composite Reliability, and Cronbach's Alpha for the Model Constructs**

Second-Order Construct	First-Order Construct	Item	Factor Loading (> 0.40)	CR (Second-Order)	CR (First-Order)	Cronbach's Alpha (Second-Order)	Cronbach's Alpha (First-Order)	
Educational Services	Quality of Educational Content	Q1	0.624	0.936	0.758	0.919	0.874	
		Q2	0.703					
		Q3	0.619					
	Faculty Performance	Q4	0.630					0.830
		Q5	0.642					
		Q6	0.627					
		Q7	0.660					
		Q8	0.415					
	Quality of Educational Planning	Q25	0.702					0.849
		Q26	0.679					
Q27		0.635						
Q28		0.706						
Q33		0.734	0.932	0.798	0.913	0.783		
Performance of Supervisors and Advisors	Q34	0.657						
	Q35	0.626						
	Facilities and Infrastructure	Q45	0.890	0.948	0.858	0.931	0.913	
Q46		0.857						
Q47		0.821						
Q48		0.768						
Electronic Services	Quality of Virtual Education	Q54	0.883	0.927	0.920	0.889	0.896	
		Q55	0.862					
Administrative Services	Performance of University Administrators	Q63	0.808	0.916	0.944	0.890	0.936	
		Q64	0.831					
Welfare Services	Quality of Welfare Facilities and Infrastructure	Q80	0.638	0.921	0.881	0.902	0.944	
		Q81	0.760					
		Q82	0.785					

Based on Table 3, the factor loadings for all items are greater than 0.40, indicating a high level of correlation with the observed variables. Moreover, the values of Cronbach's alpha and composite reliability for all constructs exceed 0.70. Therefore, it can be concluded that all constructs demonstrate a high level of reliability within the model.

Convergent validity examines the degree of correlation between each construct and its corresponding items (indicators). To assess convergent validity, the Average Variance Extracted (AVE) criterion is used, the value of which should be greater than 0.50. The AVE values for the model constructs are presented in Table 4.

**Table 4. Average Variance Extracted (AVE) Values for the Model Constructs**

Second-Order Construct	First-Order Construct	AVE (Second-Order $\geq$ 0.50)	AVE (First-Order $\geq$ 0.50)
Educational Services	Quality of Educational Content	0.676	0.615
	Faculty Performance		0.610
	Quality of Educational Planning		0.561
	Quality of Academic Assessment		0.638
Research Services	Performance of Supervisors and Advisors	0.698	0.539
	Quality of Library Resources		0.609
	Quality of Scientific Programs		0.684

Facilities and Infrastructure	Research Support		0.640
	Quality of Educational Space	0.758	0.626
Electronic Services	Quality of Educational Facilities and Equipment		0.664
	Quality of Library Space		0.822
	Quality of Virtual Education	0.709	0.539
	Management and Support of Virtual Services		0.609
Administrative Services	Quality of Electronic Equipment and Infrastructure		0.684
	Performance of University Administrators	0.821	0.549
	Performance of University Staff		0.626
Welfare Services	Quality of Administrative Services		0.651
	Quality of Welfare Facilities and Infrastructure	0.706	0.740
	Quality of Dormitories		0.615
	Quality of Cultural and Recreational Programs		0.629
	Quality of Health and Medical Services		0.845
	Quality of Counseling Services		0.640
	Quality of Financial Services		0.845

Based on the results presented in Table 4, the AVE values for all constructs are greater than 0.50. Therefore, it can be concluded that the level of correlation between each construct and its indicators is satisfactory.

Discriminant validity compares the correlation between the indicators of a construct and that construct with the correlation between the same indicators and other constructs. If an indicator shows a higher correlation with a construct other than its own, discriminant validity is questioned. In this study, the Fornell–Larcker criterion was used to assess discriminant validity. In this approach, the relationship of each construct with its indicators is compared to its relationships with other constructs using a matrix whose diagonal elements contain the square roots of the AVE values for each construct, while the off-diagonal elements represent the correlations among constructs. Table 5 presents the discriminant validity matrix based on the Fornell–Larcker criterion.

**Table 5. Discriminant Validity Matrix Based on the Fornell–Larcker Criterion**

Second-Order Constructs	Educational Services	Research Services	Facilities and Infrastructure	Electronic Services	Administrative Services	Welfare Services
Educational Services	0.906	—	—	—	—	—
Research Services	0.852	0.906	—	—	—	—
Facilities and Infrastructure	0.834	0.854	0.879	—	—	—
Electronic Services	0.713	0.751	0.808	0.822	—	—
Administrative Services	0.680	0.744	0.763	0.793	0.825	—
Welfare Services	0.636	0.691	0.722	0.741	0.797	0.842

Based on Table 5, the square root of the AVE for each construct (located on the main diagonal of the matrix) is greater than the corresponding inter-construct correlations (located below and to the left of the main diagonal). Accordingly, it can be concluded that the model constructs exhibit stronger associations with their own indicators than with other constructs.

To examine the fit of the structural model using the PLS approach, the criteria of *t-values*, the coefficient of determination (*R Squares* or  $R^2$ ), and the *Stone–Geisser criterion* ( $Q^2$ ) were employed.

The significance of the relationships between the items and the intended constructs is assessed based on the *t-value*, where the absolute value must exceed 1.96 for the relationship between each item and its corresponding construct to be considered statistically significant. Figure 1 illustrates the *t-values* in the significance testing mode.

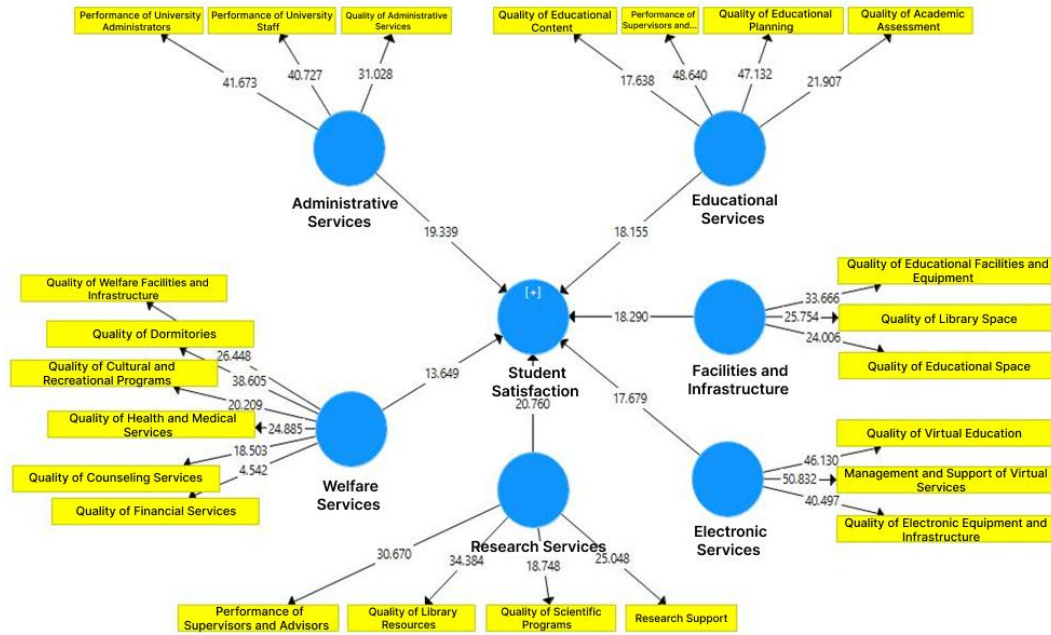


Figure 1. t-values coefficients in the significance testing mode

Based on Figure 1, the absolute *t-values* for all items are greater than 1.96. Therefore, it can be concluded that the relationships between all items and their corresponding constructs are statistically significant.

The coefficient of determination (*R Squares* or  $R^2$ ) is used to connect the measurement and structural components of structural equation modeling and indicates the effect of an exogenous variable on an endogenous variable. Values of 0.19, 0.33, and 0.67 are considered benchmarks for weak, moderate, and strong  $R^2$  values, respectively, with higher values indicating a better model fit. Figure 2 presents the factor loadings of each construct in the model along with the coefficient of determination.

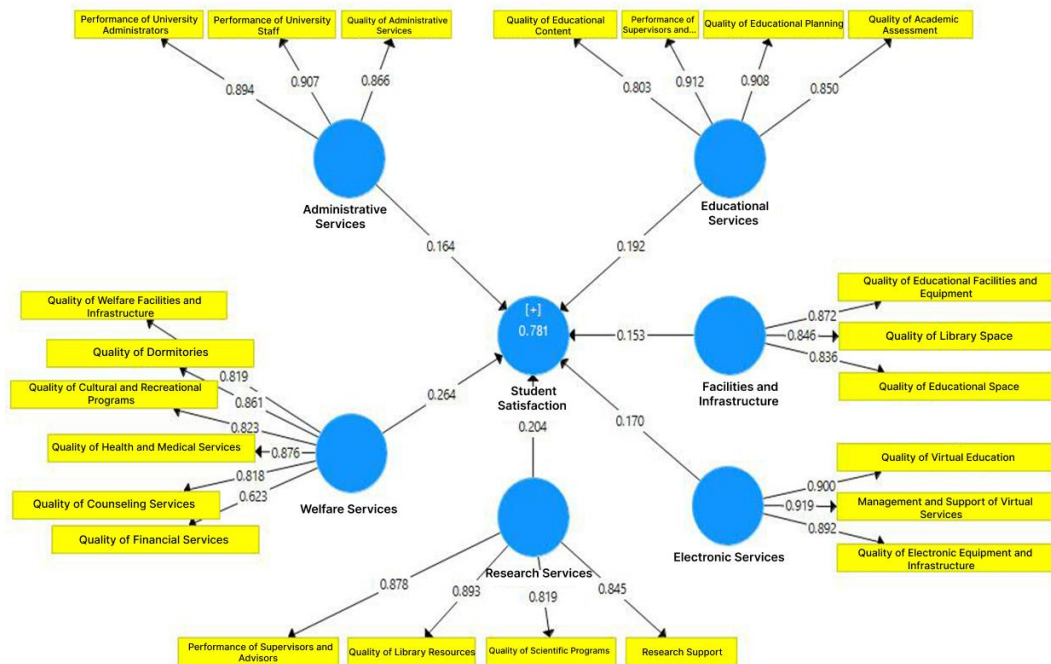


Figure 2. Factor loadings and coefficients of determination in the standardized estimation mode

The Stone–Geisser criterion ( $Q^2$ ) determines the predictive relevance of the model, and models with an acceptable structural fit should be able to predict the indicators of the endogenous constructs. Values of 0.02, 0.15, and 0.35 indicate weak, moderate, and strong predictive power, respectively. The values of  $R^2$  and  $Q^2$  are presented in Table 6.

**Table 6.  $R^2$  and  $Q^2$  Values for the Model Constructs**

Construct	$R^2$ ( $\geq 0.19, 0.33, 0.67$ )	$Q^2$ ( $\geq 0.02, 0.15, 0.35$ )
Student Satisfaction	0.781	0.480

Based on Table 6, the  $R^2$  value for the *student satisfaction* construct is greater than 0.67. In addition, the  $Q^2$  value for this construct exceeds 0.35, indicating strong predictive power of the model for this construct and confirming an appropriate fit of the structural model.

After examining the measurement and structural components of the model, the overall model fit was assessed using the *Goodness-of-Fit (GOF)* criterion. This criterion was calculated using Equation 1.

$$\text{Equation 1. GOF calculation formula: } \text{GOF} = \sqrt{(\text{Communality} \times R^2)}$$

In this equation, *communality* represents the mean of the shared variance values of the constructs, and  $R^2$  represents the mean of the  $R^2$  values of the endogenous constructs in the model. The GOF value for the model was calculated as follows:

$$\text{GOF} = \sqrt{(0.374 \times 0.998)} = 0.612$$

The GOF value obtained for the research model is 0.612. Considering the benchmark values of 0.01, 0.25, and 0.36 as weak, moderate, and strong thresholds for GOF, respectively, this result indicates a strong overall fit of the proposed research model.

## Discussion and Conclusion

The findings of the present study provide a comprehensive and empirically supported explanation of student satisfaction by demonstrating that educational services, research services, facilities and infrastructure, electronic services, administrative services, and welfare services jointly and significantly shape students' overall satisfaction. The structural model results, supported by strong path coefficients, high coefficients of determination, and substantial predictive relevance, indicate that student satisfaction is best understood as a multidimensional construct rather than a single outcome driven by isolated academic factors. This result aligns with contemporary higher education management literature, which emphasizes that students evaluate their university experience holistically, integrating academic quality with service delivery, technological support, and psychosocial conditions (4, 5, 7). The strong explanatory power of the model suggests that the identified dimensions collectively capture the core components of students' evaluative judgments, reinforcing the theoretical argument that satisfaction emerges from sustained interactions with multiple institutional subsystems.

The significant effect of educational services on student satisfaction underscores the centrality of instructional quality, faculty performance, academic planning, and fair assessment practices. These findings are consistent with prior studies demonstrating that the perceived quality of teaching and curriculum design remains a primary driver of satisfaction across educational levels and cultural contexts (6, 18, 20). Students' positive evaluations of faculty competence and pedagogical effectiveness appear to enhance not only satisfaction but also academic engagement and persistence, which further strengthens institutional outcomes. This result also resonates with research

emphasizing that dissatisfaction with teaching quality increases the likelihood of leave of absence and dropout intentions, highlighting the strategic importance of sustained investment in instructional excellence (18, 21).

Research services emerged as another significant contributor to student satisfaction, particularly for postgraduate students who rely heavily on supervisory support, access to academic resources, and research funding. The strong association between research services and satisfaction confirms earlier findings that effective supervision, library quality, and institutional research support enhance students' academic confidence and perceived institutional commitment (6, 20). Moreover, these results align with studies suggesting that satisfaction is closely linked to students' perceptions of academic growth opportunities and intellectual development, especially in research-oriented programs (16, 17). By demonstrating the relevance of research-related services, the present study extends satisfaction research beyond undergraduate teaching and highlights the differentiated needs of advanced learners.

Facilities and infrastructure also showed a substantial impact on student satisfaction, reflecting the importance of physical learning environments, classroom quality, and library spaces. This finding is consistent with service quality frameworks that emphasize tangibility as a core determinant of satisfaction (5, 7). Adequate infrastructure not only facilitates learning but also signals institutional respect for students' academic and personal needs. Prior research has shown that poorly maintained facilities undermine students' trust and emotional attachment to the institution, whereas high-quality infrastructure enhances satisfaction and loyalty (2, 4). The present results reinforce the argument that physical resources remain a critical satisfaction driver even in increasingly digitalized educational environments.

The significant role of electronic services reflects the growing centrality of digital infrastructure, virtual learning platforms, and online support systems in contemporary higher education. The findings corroborate previous studies demonstrating that satisfaction with virtual education is strongly influenced by digital literacy, platform usability, and technological support (8-10). The positive association between electronic services and satisfaction also supports evidence that effective digital environments mitigate technostress and enhance students' academic experiences, particularly in blended and online learning contexts (11, 12). This result underscores that electronic services are no longer peripheral but integral to students' satisfaction judgments, especially in institutions with large and diverse student populations.

Administrative services were found to exert a meaningful influence on student satisfaction, highlighting the importance of managerial competence, staff responsiveness, and procedural transparency. This finding aligns with studies showing that administrative efficiency shapes students' perceptions of institutional fairness and reliability (3, 4). When administrative processes are perceived as inefficient or opaque, students' satisfaction declines regardless of academic quality. Conversely, supportive and responsive administrative systems foster trust and reduce frustration, thereby enhancing satisfaction and institutional attachment (1, 2). The present results reinforce the notion that administrative services function as a critical interface between students and the institution, shaping daily experiences that cumulatively influence satisfaction.

Welfare services also demonstrated a strong and significant effect on student satisfaction, confirming the importance of non-academic support systems such as dormitories, health services, counseling, financial services, and cultural programs. This finding is consistent with growing evidence that student satisfaction is closely linked to psychological well-being and life satisfaction (13, 14). Research indicates that students who perceive strong welfare support experience lower psychological distress and higher satisfaction, even under academic pressure (12, 16).

The present study extends this literature by empirically integrating welfare services into a comprehensive satisfaction model, highlighting their essential role in supporting students' holistic development.

Collectively, the findings support an integrative view of student satisfaction that incorporates academic quality, service delivery, technological infrastructure, and psychosocial support. This multidimensional perspective is consistent with international studies emphasizing that satisfaction is embedded in broader institutional ecosystems rather than isolated educational processes (5, 19). By validating a model that captures these interrelated dimensions, the study contributes to higher education management theory and provides a robust empirical foundation for strategic decision-making.

Despite its contributions, this study has several limitations that should be acknowledged. First, the cross-sectional design limits the ability to infer causal relationships among the constructs over time. Second, the reliance on self-reported data may introduce response bias, as students' perceptions can be influenced by temporary emotional states or contextual factors. Third, the study focused on a specific institutional context, which may limit the generalizability of the findings to other higher education systems with different governance structures or cultural characteristics.

Future studies could adopt longitudinal designs to examine how student satisfaction evolves across different stages of academic progression. Comparative research across universities or countries would also enhance the external validity of the proposed model. Additionally, future research could explore moderating variables such as gender, academic discipline, or mode of study, as well as mediating mechanisms linking satisfaction to outcomes such as loyalty, performance, and well-being.

From a practical perspective, university administrators should adopt an integrated approach to satisfaction management by simultaneously improving academic quality, administrative efficiency, digital infrastructure, and welfare support. Regular assessment of student satisfaction across multiple dimensions can help identify priority areas for intervention. Investing in faculty development, digital services, and student support systems is likely to yield substantial returns in terms of satisfaction, retention, and institutional reputation.

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### **Authors' Contributions**

All authors equally contributed to this study.

### **Declaration of Interest**

The authors of this article declared no conflict of interest.

### **Ethical Considerations**

All ethical principles were adhered in conducting and writing this article.

## Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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