

The Satisfaction Bridge: How Student Engagement Drives Student Loyalty Through Satisfaction in Higher Education

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In an increasingly competitive higher education (HE) environment, fostering student loyalty is critical for institutional success. This study examines the effect of student engagement (SE) on student loyalty (SL), with student satisfaction (SS) as a mediator, in public and private universities in Pakistan. Grounded in Expectation Confirmation Theory (ECT) and the Stimulus–Organism–Response (S-O-R) model, the study addresses an empirical gap by investigating how engagement translates into loyalty through satisfaction. A quantitative, cross-sectional survey was conducted among final-year undergraduate and postgraduate students from multiple universities. Structural equation modeling was employed to test four hypotheses assessing direct and mediated relationships among SE, SS, and SL. The findings indicate that SE does not directly influence SL but exerts a significant indirect effect through SS, confirming satisfaction as a critical explanatory mechanism. These results underscore the importance of aligning engagement initiatives with student expectations to enhance satisfaction and foster loyalty. The study's limitations include its cross-sectional design and the use of multistage sampling—random selection of universities followed by convenience sampling of respondents—which may limit generalizability. Additionally, focusing on final-year students may not capture engagement and satisfaction dynamics across the full academic lifecycle. Future research should adopt longitudinal designs, include broader student cohorts, and conduct cross-cultural comparisons. Overall, this study contributes to theory and practice by integrating ECT

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and the S-O-R model and by providing empirical evidence from an emerging HE context.

Introduction

In today's increasingly competitive and student-centered higher education (HE) landscape, fostering student loyalty (SL) has become a strategic imperative, especially for universities in developing countries. SL—reflected in continued enrollment, positive word-of-mouth, and post-graduation engagement—contributes to institutional sustainability, funding, and reputation (Helgesen & Nettet, 2007; Oplatka & Hemsley-Brown, 2021). As global ranking frameworks increasingly emphasize student-centered indicators such as engagement and satisfaction, higher education institutions (HEIs) must understand the antecedents of SL to ensure long-term success (Kahu, 2013).

Among the key drivers of SL, student engagement (SE) and student satisfaction (SS) have been widely recognized (Elliott & Shin, 2002; Fredricks, Blumenfeld, & Paris, 2004). SE, a multidimensional construct encompassing students' academic and co-curricular involvement, enhances learning outcomes and institutional attachment (Kuh, 2003; Trowler, 2010). SS, in contrast, emerges from students' evaluation of their academic experience, including teaching quality, faculty interaction, infrastructure, and support services. It plays a critical role in shaping students' future loyalty behaviors (Alves & Raposo, 2007; Thomas & Galambos, 2004). Several international studies have affirmed the positive associations among SE, SS, and SL (Carmen-Herrera, Villanueva-Quispe, & Millones-Liza, 2025; Webber, Krylow, & Zhang, 2013). However, these studies often examine SE and SS as independent predictors of SL, overlooking their potential interrelationships.

In developing nations like Pakistan, research on student-centered outcomes remains fragmented and underexplored. Pakistan's HE sector comprises 262 universities serving over 1.9 million students (HEC, 2025). The sector faces multiple challenges including limited quality culture, inconsistent implementation of accreditation and quality management system (QMS) standards, resource constraints, and outdated pedagogical practices (M. Ali, Amir, & Ahmed, 2024; Iqbal, 2024; Jabeen, Hassan, & Akmal, 2023). Within this context, promoting SL is critical for institutional resilience. Challenges such as overcrowded classrooms, insufficient faculty support, inadequate student services, and weak alumni engagement further complicate retention and institutional reputation (Butt & Rehman, 2010; Ikram & Kenayathulla, 2023; Iqbal, Azlan, Allumi, & Abbas, 2025).

Existing research in Pakistan has primarily focused on service quality and overall satisfaction (Khan & Matlay, 2009; Saleem, Moosa, Imam, & Khan, 2017), with limited attention to SE as a multidimensional construct and SL as a distinct behavioral outcome. Moreover, limited research has explored whether SS serves as a mediating factor in the relationship between SE and SL, despite increasing evidence supporting its potential role in fostering loyalty (Nguyen, Vu, Saleem, & Yaseen, 2024). Given the persistent challenges in academic and co-curricular environments—such as limited student-faculty interaction and insufficient campus engagement opportunities—there is a need to investigate how engagement translates into loyalty through satisfaction (Zafar & Nausheen, 2022; Zulfqar, Hussain, & Tufail, 2024).

This study seeks to bridge existing empirical and contextual gaps by testing a mediation model wherein SS mediates the association between SE and SL. This study is theoretically underpinned by “Expectation Confirmation Theory” (ECT) and the “Stimulus-Organism-

Response” (S-O-R) model, which jointly offer a comprehensive lens for examining the psychological and behavioral processes that connect SE, SS, and SL. Additionally, the study provides actionable insights for university administrators seeking to enrich student experiences, strengthen retention strategies, and cultivate sustained institutional loyalty. Accordingly, three research questions (RQs) have been formulated, as outlined below:

RQ1: What is the effect of student engagement on student satisfaction and student loyalty?

RQ2: How does student satisfaction affect student loyalty?

RQ3: Does student satisfaction explain the link between student engagement and student loyalty?

The rest of the article presents a review of pertinent studies on SE, SS, and SL, followed by research design, including sampling and analytical procedures. Next, the statistical findings are reported, with a focus on mediation analysis. The results are then interpreted with prior research and the Pakistani HE context. Finally, the article concludes by summarizing key contributions, acknowledging limitations, and proposing directions for future research.

Literature Review

Student Loyalty

Loyalty, a well-established concept in marketing and service literature, reflects favorable attitudes and behavioral intentions, typically expressed through repeat patronage and positive word-of-mouth (Oliver, 1999). In HE, SL refers to a sustained emotional and behavioral commitment to an institution, demonstrated through continued enrollment, advocacy, and alumni involvement (Helgesen & Nettet, 2007). It is increasingly viewed as a strategic indicator of institutional success, particularly amid rising competition, funding constraints, and student mobility (Alves & Raposo, 2007; Helgesen & Nettet, 2007). Loyal students often support alumni initiatives, contribute philanthropically, and enhance institutional reputation (Hennig-Thurau, Langer, & Hansen, 2001). In Pakistan’s HE context—marked by quality disparities and structural diversity—SL is essential for student retention and long-term sustainability (M. Ali et al., 2024; Rahman, Manzoor, Yasmin, Yaqub, & Ali, 2024). Prior studies have identified SS, SE, perceived service quality, and institutional image as key predictors of SL (Alves & Raposo, 2010; Annamdevula & Bellamkonda, 2016; Tariq, Khan, Hussainy, & Tariq, 2020). Evidence shows that students who are both satisfied and engaged tend to demonstrate greater loyalty and actively endorse their institutions (Carmen-Herrera et al., 2025; Nguyen et al., 2024). However, research in Pakistan has primarily focused on SS and service quality, with limited emphasis on SL as a distinct outcome (Khan & Matlay, 2009). Notably, the mediating role of SS between SE and SL is still not well studied. This study examines how SE indirectly affects SL through SS in Pakistan.

Student Satisfaction

SS is a multifaceted construct shaped by institutional context, academic discipline, and student expectations (Elliott & Shin, 2002). In HE, it reflects the extent to which academic and social needs are fulfilled through educational experiences. As a key performance indicator, SS is associated with improved learning outcomes, higher retention, positive word-of-mouth, and



long-term SL (Alves & Raposo, 2007; Elliott & Shin, 2002). It also represents perceived value and influences re-enrollment, engagement, and advocacy behaviors. In increasingly market-driven HE systems—especially in developing countries—SS has become central to institutional quality and student-focused strategies (Douglas, McClelland, & Davies, 2008). In Pakistan, where HE expansion has outpaced quality improvement, achieving SS remains challenging. Persistent issues include overcrowded classrooms, outdated curricula, limited faculty interaction, inadequate infrastructure, weak QA mechanisms, poor quality culture, and substandard academic and support services (Albaroudi & Iqbal, 2025; Butt & Rehman, 2010; Iqbal, Taib, & Razalli, 2023). Despite greater access to HE, disparities between public and private institutions remain significant. Studies confirm that students in Pakistan frequently report low SS due to insufficient academic support and limited SE (Ikram & Kenayathulla, 2023). While existing literature has addressed service quality and general satisfaction, few studies have conceptualized SS as a mediator linking SE to SL. For example, factors like infrastructure and faculty competence are often explored, but limited focus has been given to how restricted student involvement in institutional decision-making weakens this mediating mechanism (Saleem et al., 2017). This study aims to fill the gap by investigating the effect of SE on SL, with SS serving as a mediating variable.

Student Engagement

SE is a key determinant of academic success, institutional performance, and SL in HE. It encompasses students' cognitive, emotional, and behavioral investment in academic and co-curricular activities, such as classroom participation, assignment completion, faculty interaction, and campus involvement (Fredricks et al., 2004; Kuh, 2003). While “involvement” denotes participation, SE reflects a deeper psychological and moral commitment (Berhanu & Sewagegn, 2024). SE is widely recognized as a multidimensional construct encompassing “behavioral, emotional, and cognitive” dimensions (Fredricks, Reschly, & Christenson, 2019). Consistently, Astin (1984) describes SE as the investment of both “physical and psychological” energy in learning activities. Engaged students tend to display motivation, curiosity, and initiative, contributing to improved SS and long-term SL (Trowler, 2010; Wong & Liem, 2022). In this study, SE includes both academic and co-curricular dimensions. Academic SE involves active learning, class attendance, and timely submission of tasks, while co-curricular SE entails participation in student organizations, peer-led initiatives, and institutional events (Zulfqar et al., 2024). Globally, SE is linked to student development and institutional competitiveness, but it remains underutilized in developing systems. In Pakistan, emphasis on access and infrastructure has overshadowed efforts to enhance SE. Didactic pedagogy, overcrowded classrooms, limited faculty interaction, and few extracurricular offerings reduce SE (Jabeen et al., 2023; Zafar & Nausheen, 2022). Although international research highlights strong links among SE, SS, and SL (Kahu, 2013; Webber et al., 2013), these relationships are underexplored in Pakistan. This study addresses the gap by investigating how SE affects SL through the mediating role of SS in both public and private universities.

Development of Hypotheses

Student Engagement and Student Loyalty

SE is recognized as a key factor influencing SL, with evidence suggesting that active participation in learning and campus life fosters long-term emotional and behavioral attachment to the institution. However, empirical evidence on the SE–SL relationship is limited, with only

one study reporting a significant effect (Kankhuni, Ngwira, Sepula, & Kapute, 2023). Most research has focused on other predictors—such as service quality, campus image, teaching, support systems, and academic facilities—without explicitly including SE, often in limited regional contexts (Ahmad et al., 2021; Chandra, Hafni, Chandra, Purwati, & Chandra, 2019; Fakhrudin, 2023; Fatima & Khero, 2019). A recent review further highlighted the need for studies examining SE–SL linkages across diverse institutional settings (Tahir & Fatima, 2023). Based on these gaps, the following hypothesis is proposed:

H1: SE has a significant positive effect on SL.

Student Engagement and Student Satisfaction

SE, encompassing students' active participation in academic and extracurricular activities, is widely recognized as a key determinant of SS in HE. Engaged students tend to exhibit higher motivation, enthusiasm, and commitment, leading to more meaningful and fulfilling academic experiences. Prior studies examining the relationship between SE and SS in educational contexts report mixed findings. While some research identifies a positive association between SE and SS in HE (Howson & Matos, 2021; Muzammil, Sutawijaya, & Harsasi, 2020; Satuti, Sunaryanto, & Nuris, 2020), others find no significant relationship (Kankhuni et al., 2023). Additionally, several studies on SS have omitted SE as a predictive factor, instead emphasizing determinants such as service quality and institutional image, thereby revealing a conceptual gap in the literature (Chandra et al., 2019). In Pakistan, research has primarily emphasized institutional and instructional aspects. Butt and Rehman (2010) identified teacher expertise, course offerings, classroom facilities, and the learning environment as major contributors to SS, but excluded SE. Similarly, Ikram and Kenayathulla (2023) concentrated on instructional inputs and institutional support in private universities, yet their study did not consider the contribution of SE. These omissions highlight a research gap regarding the influence of SE on SS in the Pakistani HE context. Considering the sector's expansion and the increasing emphasis on student-centered practices, this study seeks to examine how SE impacts SS. To address this gap, the following hypothesis is formulated:

H2: SE has a significant positive effect on SS.

Student Satisfaction and Student Loyalty

SS is widely recognized as a key determinant of post-enrollment behaviors such as SL, advocacy, and continued institutional affiliation. It reflects a cumulative evaluation of academic and non-academic experiences, including teaching quality, learning resources, administrative support, and campus services. From a student-centered perspective, higher SS often leads to stronger emotional attachment, increased willingness to recommend the institution, and greater long-term engagement (Alves & Raposo, 2007; Douglas et al., 2008). In Pakistan, where HE is rapidly expanding amid quality and resource constraints, understanding the SS–SL link is increasingly important. A recent study revealed that SS fully mediates the connection between brand image and SL in public universities (Rahman et al., 2024). In Bangladesh, SS significantly influenced SL, with contributing factors including SE and institutional image (Osman, Joarder, Hoque, & Jakowan, 2024). Likewise, research in Riau Province, Indonesia, showed that service quality and university image positively impacted both SS and SL (Chandra et al., 2019). However, these studies largely treated SS and SL as outcomes of institutional factors, with limited exploration of SS as a direct antecedent of SL. This gap is particularly

relevant in Pakistan's context. To fill this gap, the present research explores the direct and indirect influences of SS on SL. Accordingly, the following hypothesis is advanced:

H3: SS has a significant positive effect on SL.

Student Satisfaction as a Mediator

SS has been widely examined as a mediating variable in HE. However, limited empirical work has explored its mediating role between SE and SL. For instance, a study in Vietnam found that service quality significantly influenced sustainability practices, SS, and SL, with SS mediating the service quality–SL link (Doan, 2021). Similarly, research in Malaysian private universities showed that SS fully mediated the effect of academic facilities and partially mediated the effect of support systems on SL (Ahmad et al., 2021). Both studies emphasized institutional factors and excluded SE, limiting their generalizability to the Pakistani context. Studies in Yemen and Indonesia supported SS as a mediator between service quality and SL but did not consider SE (Fakhrudin, 2023; Qasem & Bahafi, 2024). In Australia, SS and trust mediated effects in relation to perceived service quality and brand performance, but SL was not examined as an outcome (Sultan & Wong, 2019). In Bangladesh, SS predicted institutional image, but mediation was not supported (Kalam & Hossain, 2023). In Pakistan, SS has been studied in relation to brand image and SL, with minimal attention to SE as a predictor (Rahman et al., 2024; Saleem et al., 2017). To bridge this gap, the ensuing hypothesis is formulated:

H4: SS significantly mediates the relationship between SE and SL.

Theoretical Framework

This study examines the impact of SE on SL, considering SS as a mediating factor, within the context of Pakistan's HE sector. It is grounded in two theoretical perspectives: "Expectation Confirmation Theory" (ECT) and the "Stimulus–Organism–Response" (S-O-R) framework. According to ECT (Oliver, 1980), individuals develop expectations prior to engaging in a service and subsequently assess actual performance against these expectations. Satisfaction is achieved when perceived performance aligns with or surpasses expectations, whereas dissatisfaction occurs when it falls below them (Greeshma, Vijay, & Kumar, 2025; Oliver, 1980). Within HE, ECT provides a cognitive lens to understand how alignment between students' expectations and academic experiences influences SS, which may subsequently affect SL. Complementing this, the S-O-R model (Mehrabian & Russell, 1974) explains how environmental stimuli (S) triggers internal affective and cognitive states (O), leading to behavioral responses (R). In this framework, SE functions as the external stimulus influencing students' internal evaluations (SS), which in turn shape their behavioral intentions (SL). This model has been widely applied in education to explore how engagement-related factors impact student outcomes (Hochreiter, Benedetto, & Loesch, 2023). By integrating ECT and the S-O-R model, this study captures both cognitive evaluations and emotional-behavioral processes to explain the SE–SS–SL relationship. While previous studies have emphasized service quality or institutional image, few have positioned SE as a primary antecedent of both SS and SL. This study addresses that gap by conceptualizing SE as the key driver of SS and, in turn, SL. The conceptual model (see Figure 1) identifies SE as the predictor, SS as the mediator, and SL as

the outcome variable, enabling the assessment of both direct and indirect effects.

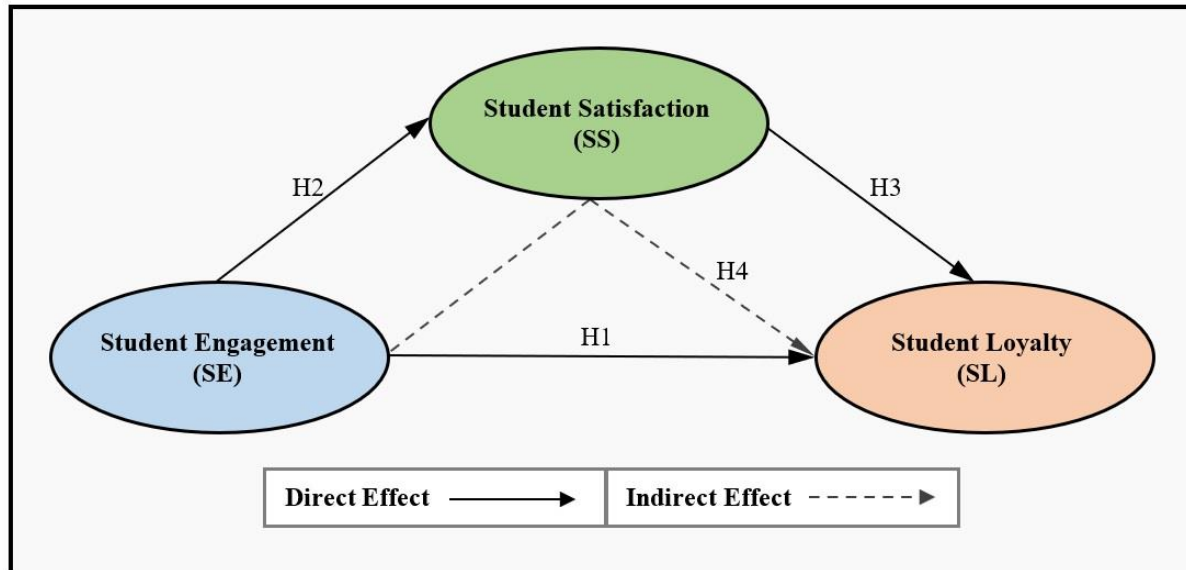


Figure 1. Conceptual Model

Methodology

Procedure and Participants.

This study adopted a survey-based, cross-sectional design to gather data efficiently from geographically dispersed respondents in a cost-effective way (Sekaran & Bougie, 2016). As of February 2025, Pakistan hosted 262 universities and approximately 1.94 million students across four provinces and three administrative units (HEC, 2025). The target population comprised final-year undergraduate and postgraduate students. A multistage sampling approach combined stratified random sampling at the institutional level with convenience sampling at the respondent level. Although convenience sampling may limit generalizability due to non-random individual selection, it is commonly used in HE research when complete sampling frames are unavailable (Arnab, 2017; Sekaran & Bougie, 2016). External validity was partly mitigated through random selection of public and private universities across provinces, ensuring institutional and geographic diversity. Consistent with methodological guidance, findings are most appropriately generalized to similar contexts rather than the entire student population (Hair, Hult, Ringle, & Sarstedt, 2022). Of 550 questionnaires distributed via Google Forms, 415 were returned. After excluding 20 straight-lined responses, 395 valid responses remained, reflecting a 71.8% response rate. G*Power analysis confirmed the sample size exceeded the minimum requirement of 119 participants (Faul, Erdfelder, Buchner, & Lang, 2009).

Measures

A structured questionnaire comprising 28 items across two sections was utilized. Responses were captured on a five-point Likert scale ranging from 1 (“strongly disagree”) to 5 (“strongly agree”), with 3 representing a “neutral” stance. The first section collected demographic data through six items, while the second included 22 items derived from validated instruments in earlier research. Fourteen items measured SE (Berhanu & Sewagegn, 2024), five assessed SS, and three captured SL (Ali, Zhou, Hussain, Nair, & Ragavan, 2016). To enhance

clarity and contextual fit, the instrument was reviewed by five subject matter experts—three university professors and two quality assurance directors from Pakistani universities. Their suggestions led to modifications in wording to improve understanding and relevance to the local context.

Demographic Profile

Table 1 displays the demographic information of the 395 participants. Respondents were nearly evenly distributed between public (53.7%) and private (46.3%) universities, with the highest provincial representation from Punjab (19.7%) and Sindh (19.2%). Gender distribution was balanced, with 51.4% male and 48.6% female students. Most respondents were aged 26–30 (35.4%) and held a BS (46.3%) or MS/MPhil (42.5%) qualification. The majority were enrolled in Social Sciences (31.6%) or Management Sciences (32.2%). Representation across universities was fairly even, with each contributing between 7.6% and 10.4% of the sample.

Table 1. *Demographic Profile*

Items	(N)	%
University		
AJK	32	8.1
BLO-1	34	8.6
BLO-2	40	10.1
GB	30	7.6
ISB	34	8.6
KPK-1	36	9.1
KPK-2	35	8.9
PUN-1	41	10.4
PUN-2	37	9.4
SIN-1	39	9.9
SIN-2	37	9.4
Sector		
Public Sector	212	53.7
Private Sector	183	46.3
Province/ Admin. Areas		
Azad Jammu Kashmir	32	8.1
Balochistan	74	18.7
Gilgit Baltistan	30	7.6
Islamabad	34	8.6
Khyber Pakhtunkhwa	71	18.0
Punjab	78	19.7
Sindh	76	19.2
Gender		
Male	203	51.4
Female	192	48.6
Age		
25 Years or Less	125	31.6
26 - 30 Years	140	35.4
31 - 35	79	20.0
36 - 40	28	7.1
41 and More	23	5.8
Qualification		
BS	183	46.3

MS/M.Phil	168	42.5
PhD.	44	11.1
Department		
Social Sciences	125	31.6
Management Sciences	127	32.2
Computer Sciences	107	27.1
Natural Sciences	36	9.1

Descriptive Statistics

Table 2 outlines the descriptive statistics for the variables examined in the study. The mean score for SE was 3.81 (SD = 0.44), indicating a considerable level of engagement with minimal variation among responses. SS also had a mean of 3.81 (SD = 0.63), while SL followed closely with a mean of 3.74 (SD = 0.63). The minimum and maximum scores across all variables suggest that responses spanned nearly the entire Likert scale. These results indicate that, on average, students reported favorable perceptions of engagement, satisfaction, and loyalty, with satisfaction and loyalty displaying slightly more variability.

Table 2. Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation (SD)
SE	395	2.57	4.64	3.8090	0.44396
SS	395	2.00	4.80	3.8147	0.63140
SL	395	2.00	5.00	3.7359	0.63214

Abbreviations: SE, student engagement; SS, student satisfaction; SL, student loyalty.

Analysis and Findings

The data were analyzed in two stages: preliminary and advanced. The preliminary analysis, performed using SPSS version 25, involved assessing normality, demographic characteristics, and descriptive statistics. The Kolmogorov–Smirnov test demonstrated a deviation from normality in the data distribution. For the advanced analysis, Partial Least Squares Structural Equation Modeling (PLS-SEM) was conducted using SmartPLS version 4. PLS-SEM is appropriate for small sample sizes and non-normally distributed data. Compared to covariance-based SEM, it provides greater flexibility for complex models and is recognized for its predictive accuracy, capability to estimate latent variable scores, and minimal dependence on multivariate normality (Hair, Risher, Sarstedt, & Ringle, 2019). Before conducting the analysis, common method bias (CMB) was evaluated, following recommendations for data collected from a single source or at one time point (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Harman’s single-factor test revealed that one factor explained only 23.51% of the variance, well under the 50% threshold. Moreover, full collinearity diagnostics indicated all “variance inflation factors” (VIFs) were below the 3.3 cutoff (Kock, 2015), suggesting that CMB does not pose a significant threat to the study’s validity.

Measurement Model

The measurement model (see Figure 2) was evaluated by examining indicator reliability, internal consistency, as well as convergent and discriminant validity (Hair et al., 2019). As student engagement (SE) was conceptualized as a reflective-reflective second-order construct comprising two dimensions—cocurricular engagement (CE) and academic



engagement (AE)—the evaluation was conducted at both the lower-order (LO) and higher-order (HO) levels. At the lower-order level, reliability and convergent validity were first evaluated. Two items (CE1 and CE2) were removed from the CE dimension due to low contribution to convergent validity, as the AVE value of CE was initially below the threshold of 0.50. After removal, the AVE value improved to an acceptable level.

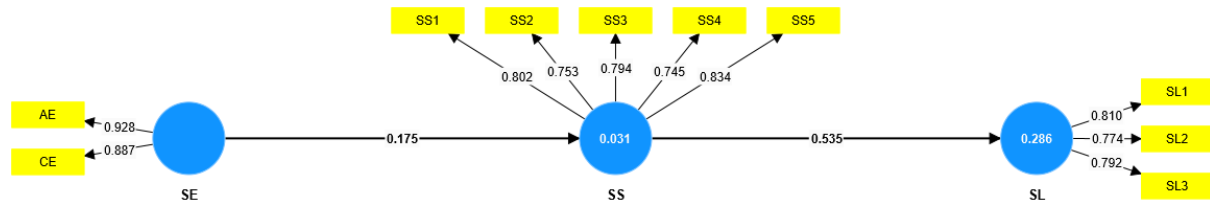


Figure 2. Measurement Model

All retained items demonstrated indicator loadings above the recommended threshold of 0.70 (see Table 3). Cronbach’s alpha values ranged from 0.703 to 0.846, while composite reliability values varied between 0.835 and 0.904. Additionally, all average variance extracted (AVE) values surpassed the 0.50 benchmark, supporting the convergent validity of the constructs (Hair, Hult, Ringle, & Sarstedt, 2017).

Table 3. Reliability and Convergent Validity

Constructs	Item	Loading	CA	CR	AVE
Student Engagement (SE)	CE	0.887	0.790	0.904	0.825
	AE	0.928			
Student Satisfaction (SS)	SS1	0.802	0.846	0.890	0.618
	SS2	0.753			
	SS3	0.794			
	SS4	0.745			
	SS5	0.834			
Student Loyalty (SL)	SL1	0.810	0.703	0.835	0.627
	SL2	0.774			
	SL6	0.792			

Abbreviations: AVE, average variance extracted; CR, composite reliability.

Next, discriminant validity was evaluated using both the Fornell–Larcker criterion and the Heterotrait–Monotrait (HTMT) ratio. As presented in Table 4, the square roots of the AVE values (diagonal elements) exceeded the corresponding inter-construct correlations (off-diagonal elements), fulfilling the Fornell–Larcker criterion (Fornell & Larcker, 1981). Furthermore, all HTMT values were below the suggested cutoff of 0.85, providing additional evidence of discriminant validity (Henseler, Ringle, & Sarstedt, 2015).

Table 4. Discriminant Validity

	SE	SS	SL
<i>Fornell–Larcker criterion</i>			
SE	0.908		
SS	0.175	0.786	
SL	0.065	0.535	0.792
<i>Heterotrait-monotrait (HTMT) criterion</i>			
SE			
SS	0.209		
SL	0.087	0.683	

Abbreviations: SE, student engagement; SS, student satisfaction; SL, student loyalty.

Structural Model

The structural model was assessed through key indicators reflecting its explanatory and predictive capabilities. These included multicollinearity diagnostics, coefficient of determination (R^2), effect size (f^2), predictive relevance (Q^2), and out-of-sample predictive accuracy. The results (see Table 5) indicate an acceptable model fit. Multicollinearity was assessed via VIF values, all below 3—well under the recommended threshold of 5—indicating no multicollinearity concerns (Hair et al., 2021). The R^2 value for SL was 0.286, indicating moderate explanatory power, whereas SS exhibited a lower R^2 of 0.031. Although the explained variance for SS is modest, this finding aligns with prior HE and behavioral research that conceptualizes satisfaction as a multidimensional outcome shaped by a wide range of academic, institutional, and contextual factors. Accordingly, modest R^2 values are common in studies examining perceptual and attitudinal constructs, particularly within exploratory or theory-integrative models (Chin, 1998; Hair et al., 2022). In line with the principle of parsimony, the present model was deliberately specified to position SE as the primary stimulus within the ECT and S-O-R frameworks, relying on a limited set of theoretically grounded constructs (Sekaran & Bougie, 2016). Effect sizes (f^2) were examined to assess the contribution of exogenous variables. According to Cohen's (1988) guidelines, the effect of SE on SS is small ($f^2 = 0.032$), whereas the effect of SS on SL is large ($f^2 = 0.400$), suggesting that while engagement modestly affects satisfaction, satisfaction plays a substantial role in driving loyalty. These findings provide empirical support for the mediating influence of SS in the structural model (Hair et al., 2017). Predictive relevance, assessed via the blindfolding procedure, yielded Q^2 values above zero for SS (0.017) and SL (0.176), confirming predictive capability (Hair et al., 2019). PLSpredict results showed weak but acceptable predictive power for SS ($Q^2_{\text{predict}} = 0.025$) and limited predictive accuracy for SL ($Q^2_{\text{predict}} = -0.003$). RMSE and MAE values for SS and SL were close in magnitude, indicating reasonable in-sample performance (Shmueli, Ray, Estrada, & Chatla, 2016). Overall, the model demonstrates satisfactory explanatory and predictive validity, underscoring SS as a mediator between SE and SL.

Table 5. Model's Performance

Construct	R^2	f^2 (SE →)	f^2 (SS →)	Q^2	RMSE	MAE
SE	—	—	—	0.000	—	—
SS	0.031	0.032	—	0.017	0.994	0.790
SL	0.286	—	0.400	0.176	1.007	0.801

Abbreviations: SE, student engagement; SS, student satisfaction; SL, student loyalty.

Hypotheses Testing

This study examined four hypotheses: three direct effects (H1–H3) and one indirect (H4), to explore the relationships among SE, SS, and SL (see Table 6). Hypothesis testing employed path coefficients, t -values, confidence intervals (CIs), and p -values, using a bootstrapping approach with 5,000 subsamples. The analysis focused on whether SS mediates the effect of SE on SL from students' perspectives. Results from the PLS-SEM analysis supported all proposed hypotheses. The direct effect of SE on SL was not significant ($\beta = -0.030$, $t = 0.685$, $p = 0.247$; 95% CI includes zero). However, significant paths were observed from SE to SS ($\beta = 0.175$, $t = 3.714$, $p < 0.001$) and from SS to SL ($\beta = 0.540$, $t = 15.805$, $p < 0.001$). Mediation analysis confirmed a significant indirect effect of SE on SL via SS ($\beta = 0.095$, $p < 0.001$; 95% CI = [0.052, 0.135]), while the total effect remained non-significant ($\beta = 0.065$,



$p = 0.106$; 95% CI = $[-0.025, 0.146]$), indicating full mediation. These results reinforce the significance of SS as the pathway by which SE contributes to loyalty.

Table 6. Hypotheses Testing

Hypotheses	Path	β	t-value	p-value	95% CI (LL, UL)	Result
Direct Effects						
H1	SE → SL	-0.030	0.685	0.247	[-0.101, 0.042]	Not Supported
H2	SE → SS	0.175	3.714	0.000	[0.094, 0.249]	Supported
H3	SS → SL	0.540	15.805	0.000	[0.479, 0.592]	Supported
Specific Indirect Effects						
H4	SE → SS → SL	0.095	3.716	0.000	[0.052, 0.135]	Supported
Total Indirect and Total Effects (for SE → SL)						
Total Indirect	SE → SL	0.095	3.716	0.000	[0.052, 0.135]	—
Total Effect	SE → SL	0.065	1.247	0.106	[-0.025, 0.146]	Full Mediation

Abbreviations: SE = student engagement; SS = student satisfaction; SL = student loyalty.

Discussion and Conclusion

Discussion

This study examined the effect of SE on SL, with SS as a mediator, in Pakistani universities. Three of the four hypothesized relationships (H2–H4) were supported, thereby affirming the framework grounded in ECT and the S-O-R model. However, the direct effect of SE on SL (H1) was not supported, indicating that engagement alone does not foster loyalty in the absence of enhanced SS. This finding is consistent with prior empirical evidence reporting a non-significant direct relationship between SE and SL (Kankhuni et al., 2023; Osman et al., 2024). Although prior research has conceptually linked SE to SL, empirical studies have often overlooked engagement as a direct predictor, instead emphasizing factors such as service quality, institutional image, or support systems (Ahmad et al., 2021; Chandra, Ng, Chandra, & Priyono, 2018; Fakhruddin, 2023). By addressing this gap, the present study demonstrates that SE influences SL indirectly through SS.

The positive impact of SE on SS (H2) reinforces that engagement enhances satisfaction when students perceive their academic and co-curricular experiences as meeting expectations. Previous research prioritized service quality or institutional branding as key drivers of SS (Butt & Rehman, 2010; Ikram & Kenayathulla, 2023), but this study highlights SE as a crucial, yet underexplored, antecedent. The significant SS–SL relationship (H3) supports satisfaction as a strong precursor to loyalty, consistent with both ECT and S-O-R. SS reflects an internal evaluation shaping students' attitudes and behavioral intentions toward their institutions, aligning with findings from South Asia (Osman et al., 2024; Rahman et al., 2024).

Finally, the mediating role of SS (H4) confirms its pivotal function in translating SE into SL. SE (stimulus) influences SS (organism), which then drives SL (response), per the S-O-R framework. Simultaneously, ECT explains that loyalty emerges from satisfaction derived from confirmed expectations. This mediated pathway deepens understanding of the SE–SL link,

extending prior research focused primarily on institutional factors over student-driven dynamics (Ahmad et al., 2021; Doan, 2021).

Conclusion

This study examined the effect of SE on SL, mediated by SS, within Pakistani public and private universities. Grounded in ECT and the S-O-R model, four hypotheses were tested, with three (H2–H4) supported. Findings confirm that SE influences SL indirectly through SS, while the direct SE–SL link (H1) was unsupported, indicating that engagement alone does not foster loyalty. For university leaders and policymakers, these results underscore the importance of prioritizing SS as the mechanism through which engagement translates into loyalty. Institutions should implement initiatives—such as interactive pedagogy, co-curricular activities, and tailored academic support—that align with student expectations and monitor outcomes through continuous feedback. By positioning SE as a strategic input and SS as a measurable outcome, universities can enhance student retention, strengthen alumni commitment, and improve institutional reputation. A student-centered approach grounded in engagement and expectation confirmation is therefore essential for sustained success in Pakistan’s competitive HE sector.

Implications, Limitations, and Future Research

Theoretical Implications

This study advances theoretical insights into SL in HE by validating the mediating effect of SS in the SE–SL link, thus extending the relevance of ECT in this domain. The findings demonstrate that students’ post-engagement evaluations, aligned with initial expectations, critically shape SS and, subsequently, SL. Additionally, integrating the S-O-R model offers a complementary perspective by conceptualizing SE as the external stimulus, SS as the internal organismic state, and SL as the behavioral response. This dual-theoretical approach advances knowledge by showing how cognitive appraisals (ECT) and affective-behavioral processes (S-O-R) jointly govern the SE–SS–SL pathway. Furthermore, this study fills a gap in empirical research from developing countries, particularly Pakistan, by validating these frameworks across public and private universities. These results support the model’s robustness and applicability beyond the immediate context, highlighting the centrality of SE and SS in enhancing SL.

Practical Implications

The results provide practical guidance for university leaders and HE policymakers in Pakistan. As SE does not directly lead to SL, institutions must focus on enhancing SS as the key mediating mechanism. Engagement initiatives—such as interactive pedagogy, co-curricular activities, and tailored academic support—should align with student expectations to drive SS, which subsequently fosters SL. This is particularly critical in Pakistan’s competitive HE landscape, where student retention and institutional reputation are pressing concerns. The results also underscore the importance of implementing continuous feedback systems to monitor whether student expectations are met. Both public and private institutions are encouraged to implement quality enhancement initiatives centered on SS, recognizing it as a key driver of enduring outcomes such as alumni commitment and reputational advocacy. By positioning SE as a strategic input and SS as a measurable outcome, universities can more



effectively cultivate SL. A student-centered approach grounded in meaningful engagement and expectation confirmation is essential for sustained institutional success.

Limitations and Future Research

This study provides insights into the contributions of SE and SS to SL, while acknowledging certain limitations. First, the cross-sectional design limits causal inferences; future research could adopt longitudinal or experimental approaches to examine how SE and SS develop and influence SL over time. Second, convenience sampling at the respondent level, while practical for a dispersed population, limits generalizability; however, the initial random selection of universities across provinces partially mitigates this limitation (Arnab, 2017; Hair et al., 2022; Sekaran & Bougie, 2016). Future studies could employ probability sampling or include more diverse samples across university types, regions, and disciplines. Third, focusing on final-year students provides a targeted perspective, but including earlier cohorts could reveal changes in SE and SS across academic stages. Finally, comparative studies in different cultural or institutional contexts would enhance the global applicability of the findings.

Declarations

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Conflict of Interest: *The authors declare no conflict of interest related to this study.*

Informed Consent: *Informed consent was obtained from all participants prior to the survey. Participants were required to review the study information and provide consent by selecting a confirmation checkbox before proceeding. Participation was voluntary, and only individuals aged 18 years or older were eligible to participate.*

Data availability: *All relevant data for this article are available from the corresponding author upon reasonable request.*

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