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# Leveraging institutional loyalty: a marketing framework for driving graduate re-enrolment in higher education

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**Introduction:** This study examines the role of a formalized Customer Relationship Management (CRM) framework in improving student satisfaction and loyalty within a non-profit private university in Saudi Arabia. Drawing on reciprocity and relationship marketing theories, the research investigates how CRM tools, including multi-tiered feedback systems and key performance indicators (KPIs), shape student experiences and influence re-enrolment.

**Methods:** This quantitative study utilized a longitudinal cross-sectional design, administering the same survey instrument to distinct student populations across two consecutive years. A mixed-methods design combined quantitative survey data with sentiment analysis and Latent Dirichlet Allocation (LDA) of open-ended responses.

**Results:** Results reveal a positive correlation between CRM-driven service quality and student satisfaction. These findings indicate that a formalized framework fosters student loyalty and encourages higher rates of postgraduate enrollment.

**Discussion:** The study contributes to CRM literature in higher education by demonstrating the efficacy of relationship marketing in a non-profit academic context. It offers a replicable model for institutions seeking to enhance student relationships, improve strategic service delivery, and boost overall institutional performance.

## KEYWORDS

customer relationship management, higher education, loyalty, re-enrolment, satisfaction

## 1 Introduction

Saudi Arabia's higher education system is evolving rapidly under Vision 2030, a national plan to build a knowledge-based economy and lessen its dependence on oil (Mohiuddin et al., 2023). This initiative has led to significant government investment in education, making the sector more competitive as public and private universities vie for students (Alasiri and Mohammed, 2022; Ghulam and Mousa, 2019). While public universities have traditionally dominated, private institutions are gaining global recognition and competing directly with top public schools in international rankings (Times Higher Education, 2025). This intense competition makes student satisfaction and loyalty essential for institutional success (Rojas-Méndez et al., 2009).

Despite the importance of student loyalty in this environment, there is a significant research gap. Existing studies in Saudi Arabia often focus on general factors like academic experience, but they do not directly examine the effect of a formal Customer Relationship Management (CRM) framework (Rashed Alshareef et al., 2023). There is a lack of empirical evidence showing how a structured, data-driven approach to student relationships affects key outcomes like satisfaction and retention. Furthermore, research on student loyalty, particularly

for postgraduate re-enrolment, is limited and often needs validation in different cultural settings (Rehman et al., 2022; Todea et al., 2022).

This study aims to fill that void by exploring how a formalized CRM framework, one using a multi-tiered system of surveys linked to key performance indicators (KPIs), influences student satisfaction and loyalty at a private, non-profit Saudi university. The research will use a case study to provide empirical evidence, validate existing loyalty theories within Saudi Arabia's unique context, and demonstrate a direct connection between a comprehensive CRM system and key student outcomes. The paper is structured to first review the literature, and then present the study's conceptual framework and methodology, followed by the results, and finally, a discussion of the findings, their contributions, limitations, and a future research agenda.

## 2 Literature review

### 2.1 Kingdom of Saudi Arabia higher education context

Higher education in Saudi Arabia is undergoing a significant transformation, driven by the ambitious goals of Vision 2030 (Mohiuddin et al., 2023). The government has made substantial investments to expand educational access and improve quality, aiming to create a knowledge-based economy that reduces reliance on oil (Alasiri and Mohammed, 2022). A key challenge, however, is aligning academic programs with the demands of a rapidly changing job market, particularly in fast-growing sectors like technology and healthcare (Allmnakrah and Evers, 2020). This has led to a strategic shift toward more specialized and technically oriented curricula.

The higher education sector is marked by increasing competition between public and private universities (Ghulam and Mousa, 2019). Public universities, which have long dominated the landscape, attract most students due to their strong reputation, tuition-free education, and perceived superior job placement rates (Ghulam and Mousa, 2019). These institutions, being government-funded, hold a considerable advantage. However, as part of Vision 2030's privatization push, the government is actively supporting the growth of the private sector. Private universities are responding by offering niche programs, forging international partnerships, and adapting more quickly to market needs to attract students and differentiate themselves from their public counterparts (Abubakar et al., 2020).

This evolving competition is leading to a more dynamic and responsive higher education system. Concurrently, private institutions are expanding their offerings and striving to provide greater value to students. This competitive pressure is a vital force for raising the overall quality of education and ensuring that all institutions are better equipped to meet the needs of the national economy and its future workforce (Ghulam and Mousa, 2019). Ultimately, this dynamic environment is essential for building the skilled talent pool needed to realize the full potential of Vision 2030.

Non-profit private universities in Saudi Arabia are rapidly emerging as formidable competitors to the country's long-established public institutions in global higher education rankings. While public universities like King Fahd University of Petroleum and Minerals (KFUPM), King Abdulaziz University (KAU) and King Saud University (KSU) have traditionally held the top spots, driven by extensive funding and deep-rooted reputations, a new tier of private

universities is proving its capability. A prime example is Prince Mohammad bin Fahd University (PMU), which secured a place in the 251–300 global band in the 2025 Times Higher Education (THE) World University Rankings (Times Higher Education, 2025). This impressive standing places PMU as the second-ranked university in Saudi Arabia, a position it shares with KSU. This achievement underscores the significant potential of private, non-profit universities to compete at the highest levels, not only regionally but also on the global stage, by focusing on institutional innovation and specialized programs.

### 2.2 Factors influencing loyalty of students in higher education

Student loyalty is defined as a student's positive emotional and mental connection to their institution, which in turn motivates their actions and behavior (Verhoef et al., 2002). This loyalty is primarily driven by satisfaction, which is the most significant factor influencing it (Paswan and Ganesh, 2009; Santini et al., 2024). While other elements like student engagement and perceived value also contribute, their impact on loyalty is not as strong (Santini et al., 2024).

Research indicates that both academic and non-academic aspects of the educational experience are crucial for shaping student satisfaction and loyalty (Masserini et al., 2019; Weerasinghe and Fernando, 2018). On the academic side, the quality of teaching, specifically lectures and course organization, are key factors in a student's satisfaction and loyalty (Masserini et al., 2019). For non-academic services, factors such as university facilities, administrative staff, location, and the institutional image are all strongly linked to student satisfaction levels (Weerasinghe and Fernando, 2018). Moreover, extant research found a statistically significant relationship between a university's reputation and student loyalty (García-Rodríguez and Gutiérrez-Taño, 2024), concluding that reputation directly influences loyalty (Kaushal and Ali, 2020; Raja, 2023).

Ultimately, service quality is a direct determinant of student satisfaction, which, along with a positive institutional image, profoundly affects student loyalty (Ali et al., 2016). Therefore, universities should prioritize improving their services to build and maintain student loyalty (Todea et al., 2022). This focus on a high-quality experience helps create a positive brand image and fosters greater student satisfaction, trust, and commitment (Perin et al., 2012; Todea et al., 2022).

For postgraduate programs, student loyalty is a key factor in students' decisions to re-enrol in a higher education institution (Rehman et al., 2022). The concept of re-enrolment intention has evolved, and it is now understood as an outcome of a student's satisfaction and perceived value, which then fosters loyalty. Earlier research focused exclusively on the behavioral dimension of loyalty, a student's action to re-enrol. However, loyalty is also a cognitive process, where students consciously evaluate different university options before deciding (Caruana, 2002). Therefore, a student's intention to re-enrol is influenced by both their attitudes and their past behavior, spanning their entire period of study and beyond (Bowden, 2011).

Cultivating this loyalty is essential for a university's competitive advantage (Rojas-Méndez et al., 2009; Ghorbanzadeh et al., 2024) as retaining existing students is more cost-effective than attracting new ones (Schertzer and Schertzer, 2004). Additionally, loyal students are

valuable advocates who can generate positive word-of-mouth recommendations for the institution (Rehman et al., 2022).

However, there is still limited research on student loyalty in higher education (Ghorbanzadeh et al., 2024), specifically when it comes to re-enrolment behavior in postgraduate degree programs (Rehman et al., 2022). A review of studies published in reputable journals over the past 5 years (2020–2025) suggests several areas for future exploration. To start, the factors influencing student loyalty and re-enrolment should be validated in different cultural and national contexts to improve the generalizability of the findings (Rehman et al., 2022; García-Rodríguez and Gutiérrez-Taño, 2024). Additionally, adopting a mixed-methods approach is recommended to provide a more comprehensive understanding of re-enrolment patterns in higher education (Todea et al., 2022). Moreover, a multi-group analysis could help identify key differences in course experience, satisfaction, and loyalty among students at various institutions (Rehman et al., 2022). Research is also needed on how age influences postgraduate re-enrolment (Kaushal and Ali, 2020; Rehman et al., 2022). Finally, research could expand on this context by exploring how loyalty influences students' actual behavioral intentions (Ghorbanzadeh et al., 2024).

### 2.3 A marketing framework for higher education

As higher education faces growing competition from both the private sector and the global market, universities are increasingly pressured to market their programs more aggressively (Carvalho and De Oliveira Mota, 2010). In this environment, student loyalty has become a central factor for institutional success, with much of the research focusing on relationship marketing as a means of retention (Helgesen, 2008; Carvalho and De Oliveira Mota, 2010). Retaining students is therefore seen as vital, and concepts from relationship marketing provide valuable insights for administrators tasked with enrolment and retention strategies. This approach highlights the importance of creating student value, where institutions tailor their offerings to align with student needs (Kim and Lee, 2020).

The rise of the internet and social media has further expanded how universities engage with prospective and current students, encouraging the adoption of diverse marketing and networking strategies (Dwivedi et al., 2021). Yet, while CRM frameworks have proven effective in the business sector, they were not originally designed with higher education in mind (Khashab et al., 2020). Within this context, CRM refers to the adaptation of corporate practices to academic institutions, emphasizing student-centered strategies such as treating students as customers, understanding their expectations, enhancing satisfaction, and building loyalty (Hrnjic, 2016; Ogunnaike et al., 2014). By shifting away from fragmented operations, universities can integrate academic delivery, administration, and support services into a cohesive system that is responsive to what students value most (Hrnjic, 2016).

A key element of this integration is the Krueger/Homp SOS framework, which highlights how organizational efficiency depends on the synergy of three interlinked processes: instructional activities, managerial functions, and supportive services. Through this lens, CRM ensures that these areas work collaboratively rather than in isolation, ultimately strengthening both student satisfaction and

institutional effectiveness (Hrnjic, 2016). Research further stresses that CRM not only provides practical tools for improving processes but also reshapes higher education toward student-focused environments (Kim and Lee, 2020). Its application allows leaders and departments to redesign policies and workflows around the student experience, making the institution more responsive and effective (Hrnjic, 2016). Research emphasizes that the demonstrated link between CRM adoption and improved student satisfaction should motivate higher education leaders to prioritize its implementation. This commitment is more than an operational adjustment; it represents a strategic shift toward an educational model built on student needs and long-term outcomes (Ogunnaike et al., 2014; Hrnjic, 2016).

Despite the broader interest in student satisfaction and loyalty within Saudi higher education, there is a notable lack of research examining the adoption of CRM systems in Saudi universities and their effects on student satisfaction, retention, and loyalty. Existing studies have largely focused on determinants of loyalty such as academic experience, institutional image, and perceived quality, particularly in private universities, without directly addressing CRM integration (Rashed Alshareef et al., 2023). Similarly, research employing service quality models has provided valuable insights into satisfaction drivers but does not consider CRM frameworks as part of the analysis. While CRM applications have been studied in other higher education contexts, such as European institutions, or in specific Saudi settings like academic libraries (Hrnjic, 2016), there remains a significant research gap regarding how CRM adoption impacts Saudi students' satisfaction, retention, and loyalty. Addressing this gap presents an important avenue for future empirical studies that could guide universities in enhancing their student relationship strategies.

### 2.4 Evaluating CRM at a Saudi non-profit higher education institute

A Saudi non-profit higher education institute uses a variety of methods to engage with their students and other stakeholders to measure satisfaction and assess loyalty, a process similar to how businesses use a CRM system to get feedback from customers (Hrnjic, 2016). This approach is comprehensive and multi-tiered, involving both advisory boards and a suite of institutional and program-level surveys. Advisory boards, which include internal and external academic and industry experts, offer strategic feedback on curriculum design, KPIs, and overall program direction. Their insights help ensure that academic offerings align with the demands of the labor market and meet accreditation standards.

The university also relies on various surveys to gather direct feedback from students, graduates, and the wider community. These surveys are essential for quality assurance and continuous improvement. For instance, the Course Evaluation Survey is administered twice a year to understand student opinions on course materials, teaching quality, assessment fairness, and resource availability. The results of this survey are then used to improve the curriculum and to help instructors develop their teaching skills. Similarly, an annual Program Evaluation Survey for senior students assesses their satisfaction with teaching methods, university communication, and the quality of learning resources, with findings directly linked to specific performance indicators.

Beyond direct student feedback, the university gathers external insights to ensure its graduates are well-prepared for their careers. Through annual Employer Evaluation Surveys, employers of recent graduates rate their employees on key skills like critical thinking, teamwork, and emotional intelligence. This feedback is vital for updating the curriculum and improving strategies for job market readiness. The university also uses surveys to evaluate its internal services and resources. Learning Resources and Library Services Surveys assess the adequacy and quality of library services and electronic resources, while Technical Services Surveys evaluate the effectiveness of the university's IT services. Additionally, Student Affairs Services Surveys measure satisfaction with services like counseling and career advising to improve student support systems. Finally, Community Service Engagement Surveys collect feedback from those involved in community activities, helping the university promote civic responsibility and strengthen its community outreach efforts. All of these feedback mechanisms collectively form a robust system for understanding and enhancing the overall student experience and institutional effectiveness.

To streamline this process, these surveys are administered using specialized digital software. This software relies on existing databases that house the contact information and demographic data of the target audience, such as students, alumni, faculty, and staff. By leveraging this digital infrastructure, the university can efficiently distribute surveys, track response rates, and analyze the collected data to gain actionable insights. This technological approach ensures that feedback collection is a seamless and integrated part of the institution's overall quality management system.

The results from these various surveys are not just used for internal improvements; they are also strategically aligned with a series of measurable KPIs. These KPIs are a core component of the university's accountability framework. The data from the surveys is meticulously compiled and reported annually to the Education and Training Evaluation Commission (ETEC) as part of a mandated practice. This regular reporting ensures that the university's performance against key metrics is transparent and externally validated, demonstrating its commitment to continuous improvement and high standards of quality.

## 2.5 Research gaps and objective of research

While a significant amount of research has been conducted on student loyalty and satisfaction in higher education, a notable research gap exists within the Saudi Arabian context. Previous studies have primarily focused on general determinants of loyalty, such as academic experience and institutional image, particularly in private universities, without directly addressing the adoption and impact of a formal CRM framework (Rashed Alshareef et al., 2023). Although the literature acknowledges the value of CRM in higher education, there is a lack of empirical evidence from Saudi universities that demonstrates how a structured, data-driven approach to student relationships influences student outcomes. Furthermore, the existing literature on student loyalty in higher education is limited (Ghorbanzadeh et al., 2024), particularly concerning re-enrolment behavior in postgraduate programs (Rehman et al., 2022). There is also a recognized need to

validate findings on student loyalty in different national and cultural contexts to improve their generalizability (Rehman et al., 2022; García-Rodríguez and Gutiérrez-Taño, 2024) and to adopt mixed-methods approaches for a more comprehensive understanding (Todea et al., 2022).

Given these gaps, the objective of this research is to fill this void by exploring how a formalized CRM framework, specifically one that uses a multi-tiered system of surveys aligned with measurable KPIs, impacts student satisfaction and loyalty at a non-profit private university in Saudi Arabia. This study aims to provide empirical evidence on the effectiveness of this CRM approach, moving beyond general discussions to a specific case study. It will also validate existing theories of student loyalty within the unique cultural and competitive landscape of Saudi higher education, as recommended by recent literature (Rehman et al., 2022; García-Rodríguez and Gutiérrez-Taño, 2024). Ultimately, the research seeks to demonstrate a direct link between a comprehensive CRM system and key student outcomes, offering a practical model for other universities to enhance their student relationship strategies and improve institutional effectiveness.

## 3 Conceptualization

Several theories were used to examine students' loyalty in the context of higher education. For Instance, the theory of reciprocity (Ghorbanzadeh et al., 2024) postulates that individuals tend to respond to generous or positive actions with similar behavior, while negative actions often lead to retaliatory or punitive responses (Hadi et al., 2019). Such reciprocal exchanges enable higher education institutions to foster mutually beneficial interactions and cultivate lasting relationships with their students (John and De Villiers, 2024).

However, for a relationship to develop a strong sense of commitment, the parties involved must feel that the connection is important or valuable to them (Clark et al., 2017). In other words, the interactions they share, whether its support, information, or resources, need to provide a clear and tangible benefit to the other party, prompting them to give something back in return. Accordingly, reciprocity is a vital dimension contributing to relationship marketing, with particular emphasis to relationship quality (Magnusen et al., 2012), even more so than traditional marketing functions (Yau et al., 2000).

Furthermore, it is important to note that effective relationship marketing, and its underlying aspect of reciprocity, must align with the cultural context (Hoppner et al., 2015). Further research combined the theory of planned behavior and expectancy-value theory to study how e-marketing affects student loyalty, mediated by enrolment intention and moderated by electronic word-of-mouth (Ong et al., 2023; Wahab et al., 2024). The premise that the quality of the learning experience, resources, and facilities directly affects student satisfaction, which in turn leads to loyalty, is well-supported by the provided research. The core argument rests on a clear causal link that begins with service quality and culminates in student loyalty.

The research indicates that service quality is a direct determinant of student satisfaction (Ali et al., 2016). This encompasses both academic and non-academic aspects of the educational experience. On the academic side, the quality of teaching, including lectures and course organization, is a key factor in a student's satisfaction and loyalty (Masserini et al., 2019). This highlights the direct impact of the



modelling to identify underlying themes in the open-ended responses, thereby supporting the quantitative scores and overall sentiment analysis. This comprehensive, multi-phase approach provides a replicable model for other institutions seeking to improve their student relationship strategies and overall institutional performance.

#### 4.1 Phase one: alumni re-enrolment patterns

To assess the loyalty and suitability of the higher education institution, the study first examined alumni re-enrolment patterns. A robust dataset of 274 alumni who pursued postgraduate studies at their alma mater was analysed. The demographic profile highlighted a strong domestic focus, with Saudi nationals representing the vast majority. The gender distribution, 186 males compared to 88 females, likely reflects historical enrolment patterns of the university's largest feeder colleges.

Undergraduate origins were heavily concentrated in two schools: the College of Business Administration (57.3%) and the College of Engineering (34.3%), together accounting for 91.6% of the re-enrolment pipeline. This indicates that these two colleges remain the university's primary engines for postgraduate recruitment. The average undergraduate GPA of 3.07 shows that the institution successfully appeals to a wide academic range of its alumni.

A notable trend emerged in postgraduate study choices: 86.5% of re-enrolled students pursued programs within the College of Business Administration, particularly the MBA and its executive variant. Notably, many Engineering graduates transitioned into MBA programs, demonstrating a strong cross-disciplinary pull and the perception of the MBA as a valuable complementary qualification. Postgraduate GPA averages were higher than undergraduate averages, indicating improved academic performance at the graduate level. A smaller group also progressed to doctoral studies within the same institution, displaying the university's ability to cultivate long-term academic pathways.

Re-enrolling 274 students from an alumni base of 6,690 represents a re-enrolment rate of approximately 4.1%, a significant institutional achievement. This success reflects a clear strategy of leveraging the university's strong undergraduate reputation in Business and Engineering to build seamless postgraduate pathways. Most notably, the MBA program has been effectively "cross-sold" to graduates from other disciplines, strengthening brand loyalty and fostering a culture of lifelong learning.

#### 4.2 Phase two: analysing the association between CRM factors and students' satisfaction

Building on the alumni re-enrolment analysis, the study next assessed how senior students perceive the quality of their educational experience, learning resources, and institutional support. An institutional survey, aligned with ETEC requirements, was used to measure senior students' evaluation of their learning experience (the institutional KPI). The survey questions were designed to measure CRM-driven service quality, operationalized through two key constructs from our conceptual framework: (1) Learning Experience

(Q1–Q7), encompassing teaching quality, course organization, and instructor-student interaction; and (2) Learning Resources and Facilities (Q8–Q13), covering library services, technological infrastructure, and campus amenities. This direct mapping ensures that the measured satisfaction scores are explicitly linked to the institutional CRM framework's outputs.

Two rounds of surveys were conducted in consecutive academic years: Spring 2024 (Survey 1) and Spring 2025 (Survey 2). The sampling procedure for both surveys was intended to be a census approach, targeting all eligible senior students. The analysis confirms the study involved two distinct administrations: Survey 1 achieved a response rate of 28.80% (375 responses out of 1,302 invited). Survey 2 recorded a low response rate of 9.69% (57 responses out of 588 invited). Regarding demographic details (gender, program, and age), the data was intentionally not collected to preserve the anonymity and confidentiality of participants, thereby encouraging candid feedback on institutional services and prioritizing unbiased satisfaction data over the ability to conduct demographic subgroup analysis.

The surveys were distributed digitally and comprised both closed-ended items, rated on a five-point Likert scale, and two open-ended questions to capture qualitative insights. After removing incomplete responses, the final valid sample included 375 responses in Survey 1 and 57 in Survey 2. Because the survey was anonymous, demographic details such as gender, age, or nationality were not collected. [Table 1](#) summarizes the mean satisfaction scores and response counts across both survey administrations.

The reliability analysis for both surveys demonstrated internal consistency, confirming that the instruments are highly dependable for measuring the intended constructs. Specifically, Survey 1 achieved a Cronbach's Alpha of 0.969 across 13 items. Similarly, Survey 2 showed equally strong reliability, yielding a Cronbach's Alpha of 0.958. Both values significantly exceed the acceptable reliability threshold of 0.70 ([Bonett and Wright, 2015](#)).

The Inter-Item Correlation Matrix provides statistical evidence that supports the high internal consistency reliability of both surveys ([Choi et al., 2010](#)). For Survey 1, the matrix revealed a strong pattern of positive correlations, with most coefficients well above  $r = 0.65$ , indicating that the 13 items are highly interrelated and measure the same underlying construct ([Table 2](#)). Similarly, Survey 2 also demonstrated strong positive correlations (ranging from  $r = 0.329$  to  $r = 0.892$ ), confirming the homogeneity of its 13-item scale.

With respect to the validity of the measurement tool, an Exploratory Factor Analysis (EFA) was undertaken to assess the construct validity of the *Learning and Learning Resources* dimension in relation to student satisfaction. [Table 3](#) presents the orthogonal rotation matrix for the 13 items included in the analysis. The factor structure clearly converged on three distinct components, each demonstrating strong and conceptually coherent loadings.

The results demonstrate acceptable psychometric properties. All factor loadings exceed the recommended threshold of 0.70, indicating strong associations between items and their respective latent constructs. The Kaiser–Meyer–Olkin (KMO) value of 0.969 reflects acceptable sampling adequacy, confirming that the correlation patterns are highly suitable for factor extraction ([Watkins, 2018](#)). In addition, Bartlett's Test of Sphericity was significant ( $\chi^2 = 5103.49$ ,  $p < 0.001$ ), rejecting the null hypothesis of an identity matrix and confirming sufficient inter-item correlations to justify factor analysis ([Watkins, 2018](#)).

TABLE 1 Average satisfaction score and response counts.

Question	Mean score (Survey 1)	Response count (Survey 1)	Mean score (Survey 2)	Response count (Survey 2)
Q1: Learning material	3.90	375	3.70	57
Q2: Teaching dynamics	3.82	375	3.63	57
Q3: Teacher communication	3.85	375	3.82	57
Q4: Information availability	3.87	375	3.72	57
Q5: Teaching methods	3.85	375	3.72	57
Q6: Teacher feedback	3.82	375	3.72	57
Q7: Overall experience	3.91	375	3.74	57
Q8: LRC services	3.84	375	3.74	57
Q9: Course facilities	3.86	375	3.68	57
Q10: E-learning services	3.92	375	3.68	57
Q11: Extra-curricular	3.78	375	3.61	57
Q12: Campus services	3.57	375	3.30	57
Q13: Counselling	3.76	375	3.65	57

TABLE 2 Inter-item correlation matrix.

Item/question numbers	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13
Q1	1.000												
Q2	0.763	1.000											
Q3	0.716	0.786	1.000										
Q4	0.663	0.711	0.715	1.000									
Q5	0.705	0.792	0.775	0.753	1.000								
Q6	0.680	0.783	0.814	0.705	0.827	1.000							
Q7	0.772	0.799	0.793	0.707	0.854	0.813	1.000						
Q8	0.671	0.669	0.667	0.700	0.704	0.649	0.739	1.000					
Q9	0.681	0.675	0.701	0.651	0.703	0.666	0.745	0.736	1.000				
Q10	0.647	0.697	0.672	0.691	0.714	0.662	0.727	0.756	0.738	1.000			
Q11	0.727	0.737	0.710	0.671	0.747	0.696	0.780	0.775	0.747	0.748	1.000		
Q12	0.601	0.628	0.617	0.602	0.635	0.596	0.661	0.630	0.651	0.582	0.663	1.000	
Q13	0.675	0.752	0.703	0.665	0.741	0.707	0.766	0.699	0.730	0.676	0.731	0.711	1.000

Overall, the two surveys paint a consistent picture of broadly positive student experiences. In Survey 1, mean scores ranged from 3.57 to 3.92, while in Survey 2, they ranged from 3.30 to 3.82. The slight declines observed in Survey 2 should be interpreted with caution, given the much smaller sample size, which makes the results more sensitive to individual variation.

Key strengths remained stable across both surveys. Teacher-student communication showed virtually no change (3.85 to 3.82), underscoring consistently strong faculty engagement. Similarly, teacher feedback and counselling services maintained steady satisfaction levels. These results suggest that core aspects of the learning environment remain reliable and well-regarded.

Where decreases were noted, they were modest (typically 0.1 to 0.2 points). For example, learning materials, teaching dynamics, and teaching methods saw slight declines, but all remained within the

positive range. E-learning services and campus services reflected somewhat larger drops but continued to score above the midpoint, showing that students still rated these areas favorably. Overall, the findings suggest a stable and positive perception of institutional quality, with scope for incremental improvements in certain areas.

To assess H1, a multiple linear regression analysis was conducted using SPSS software and data from the first survey to examine the relationship between CRM factors and student satisfaction. The results of this analysis are summarized in the Table 4.

The regression model demonstrates strong predictive power and statistical significance. The F-statistic of 140.9 ( $p < 0.001$ ) confirms the model's overall significance, indicating that the CRM factors are a meaningful predictor of student satisfaction. The multiple correlation coefficient (R) of 0.889 shows a very strong positive correlation, while the coefficient of determination (R<sup>2</sup>) of 0.791 indicates that 79.1% of

the variance in student satisfaction is explained by the CRM factors. The positive standardized beta coefficient ( $\beta$ ) of 0.157 supports the hypothesis that improvements in CRM factors lead to increased student satisfaction. Finally, the t-statistic of 37.5 ( $p < 0.001$ ) confirms that this relationship is statistically significant and not due to chance, establishing the CRM factors as a highly reliable predictor of student satisfaction.

To assess H2, A multiple linear regression analysis was conducted to test the hypothesis that customer relationship management (CRM) factors related to the learning resources have a positive impact on student satisfaction. The results of this analysis are presented in the following Table 5.

TABLE 3 Orthogonal rotation matrix of items related to learning experience, learning resources and facilities with student satisfaction.

Item	Factor 1	Factor 2	Factor 3
1	0.820		
2	0.873		
3	0.860		
4	0.812		
5		0.828	
6		0.831	
7		0.820	
8		0.742	
9			0.890
10			0.853
11			0.913
12			0.865
13			0.846

TABLE 4 Hypothesis 1 regression analysis—Survey 1.

Hypothesis	R	R <sup>2</sup>	F	Sig. (F)	Beta ( $\beta$ )	t	Sig. (t)
CRM factors related to the learning experience have a positive impact on student satisfaction	0.889	0.791	140.9	0.000	0.157	37.5	0.000

TABLE 5 Hypothesis 2 regression analysis—Survey 1.

Hypothesis	R	R <sup>2</sup>	F	Sig.	Beta ( $\beta$ )	t	Sig.
CRM factors related to the learning resources have a positive impact on student satisfaction	0.847	0.717	946.1	0.000	0.152	30.7	0.000

The regression model shows strong predictive power and statistical significance. The F-statistic of 946.1 ( $p < 0.001$ ) confirms that the CRM factors are a significant predictor of student satisfaction. A strong positive correlation is indicated by the multiple correlation coefficient (R) of 0.847. Furthermore, the coefficient of determination (R<sup>2</sup>) of 0.717 reveals that the CRM factors explain 71.7% of the variance in student satisfaction. The positive standardized beta coefficient ( $\beta$ ) of 0.152 supports the hypothesis that improved CRM factors lead to increased student satisfaction. Finally, the highly significant t-statistic of 30.7 ( $p < 0.001$ ) confirms that this relationship is statistically significant.

Comparable findings were identified in the multiple linear regression analysis using the data taken from the second survey (see Tables 6, 7).

### 4.3 Phase three: sentiment analysis

To complement the quantitative data, a sentiment analysis of open-ended survey questions was conducted. Students were asked:

- Q14: “What do you like most about your studies at the program?”
- Q15: “What are the areas that require further improvements in the program?”

Using Python, the open-ended responses were first cleaned by excluding entries marked as blank, “D/A,” or placeholders to ensure data quality. The cleaned dataset was then analysed with TextBlob (Aljedaani et al., 2022), a lexicon-based sentiment analysis tool that assigns polarity scores on a scale from -1.0 (highly negative) to +1.0 (highly positive). The analysis revealed that responses to Q14 (Likes) had a mean polarity score of +0.16, indicating an overall positive tone in how students described what they valued most about their studies (Figure 1). For Q15 (Improvements), the mean polarity was +0.13,

TABLE 6 Hypothesis 1 regression analysis—Survey 2.

Hypothesis	R	R <sup>2</sup>	F	Sig. (F)	Beta ( $\beta$ )	t	Sig. (t)
CRM factors related to the learning experience have a positive impact on student satisfaction	0.911	0.830	267.8	0.000	0.173	16.4	0.000

TABLE 7 Hypothesis 2 regression analysis—Survey 2.

Hypothesis	R	R <sup>2</sup>	F	Sig. (F)	Beta ( $\beta$ )	t	Sig. (t)
CRM factors related to the learning resources have a positive impact on student satisfaction	0.817	0.671	112.4	0.000	0.143	10.6	0.000



TABLE 9 Key themes from topic modelling of suggested improvements (Q15).

Theme label (interpreted topic)	Top weighted keywords from LDA model	Prevalence (%)
Need for more resources and support	Student, program, academic, faculty, learning	~13.5%
Modernization of lab facilities and equipment	Instructor, learning, area, access, tool	~25.8%
Enhanced academic advising availability	Nothing, restaurant, different, need, offer	~30.1%
Timelier feedback on assignments	Program, teaching, doctor, nothing, improvement	~7.5%
Improved campus amenities (cafeteria, prayer space)	Time, need, part, design, class	~23.1%

Prevalence is an estimate based on the model's topic distribution.

- **Improved Availability of Academic Advising (30.1%):** This area was the most commonly proposed area to improve. The terms “nothing,” “restaurant,” “different,” and “need” imply that there is a great need for more variety, presence, and fulfilling support systems. The need for better advising is comparable to the need for better food.
- **Lab Facilities/Equipment Modernization (25.8%):** A quarter of the feedback mentioned the problem of learning infrastructure. Keywords such as instructor, learning, area, access and tool indicate that there is a demand to renovate laboratories, enhance tools and make more accessible learning areas to accommodate hands-on learning.
- **Better Campus Amenities (23.1%):** This theme is closely connected to the first one, as it focuses on the experience of the student outside the classroom. The words time, need, part, design and class imply comments on availability, design, and functionality of such spaces as cafeterias, prayer rooms, and common areas.
- **Desire More Resources and Support (13.5%):** Students requested more academic and faculty support, which means that they need more resources that could help them in the learning process.
- **Timely Feedback on Assignments (7.5%):** The weakest theme, but significant to academic growth. Such keywords as teaching, doctor, and nothing can reveal a need to receive more specific, timely, and professional feedback on the part of instructors.

This is a prioritized list of themes that gives a clear, data-driven roadmap to the strategic planning of the institution. These particular issues, especially the most pressing ones, such as academic advising and modernized facilities, can be addressed with the help of the CRM framework.

These qualitative themes directly complement the quantitative survey results. While the theme of “Quality of Instruction” confirms a high level of satisfaction with teaching and communication, the positive criticism identified through sentiment analysis highlights key areas for improvement in infrastructure and support. This mixed-methods approach provides a holistic view of the student experience, validating quantitative ratings with rich qualitative data and offering a clear roadmap for enhancing institutional performance and student loyalty.

## 5 Discussion

This study reveals a direct link between a formalized CRM framework and improved student satisfaction and loyalty at a non-profit private university in Saudi Arabia. The findings build on existing literature and validate the proposed hypotheses within a unique cultural context. The university’s strategic use of a multi-tiered feedback system, including surveys, advisory boards, and KPIs, demonstrates how a structured, data-driven approach to student relationships can translate into tangible outcomes like high re-enrolment rates and positive student sentiment.

In phase one, the analysis of alumni re-enrolment patterns provides compelling behavioral evidence of student loyalty. A 4.1% re-enrolment rate among alumni, heavily concentrated in the College of Business Administration and particularly its MBA program, confirms that the university’s CRM efforts effectively “cross-sell” graduate programs and build long-term relationships. This finding aligns with previous research highlighting how retaining existing students is more cost-effective than attracting new ones (Schertzer and Schertzer, 2004). It also underscores the competitive advantage gained by leveraging a strong undergraduate reputation to create seamless postgraduate pathways (Rojas-Méndez et al., 2009).

In phase two, the survey analysis provides further support for the hypotheses. The consistently positive mean satisfaction scores across two consecutive academic years, despite a smaller sample in the second survey, confirm that students are generally satisfied with their overall educational experience. The results validate the two hypotheses, which posited a positive relationship between CRM factors related to the learning experience (e.g., teaching quality, communication) and learning resources (e.g., e-learning, campus services) and student satisfaction. In phase three, the sentiment analysis further enriches this picture, showing that even when students suggest improvements, their feedback is framed constructively, reflecting a positive underlying relationship with the institution.

This positive tone was additionally deconstructed with topic modelling showing that the most common theme of Likes (51.6%) was that of Holistic Program Satisfaction, which reflects non-specific contentment. This reinforces the idea that satisfaction is the most significant factor influencing loyalty (Paswan and Ganesh, 2009; Santini et al., 2024). The consistent strengths in faculty-student interaction and the constructive nature of feedback suggest the university is successfully cultivating a positive emotional and mental connection with its students, a core component of loyalty as defined in the literature (Verhoef et al., 2002).

More importantly, the conversation of proposed improvements (Q15) modelled the strategy priorities hierarchy using data. The most common themes, including “Enhanced Academic Advising Availability” (30.1%), Modernization of Lab Facilities, and Equipment (25.8%), go beyond general sentiment to provide the institution with a roadmap on how to intervene in a specific manner. This observation shows how advanced text analytics can transform qualitative feedback into accurate operational data.

The study’s findings are consistent with the theoretical framework, which posits that service quality directly influences satisfaction, leading to loyalty (Ali et al., 2016). The university’s strategic focus on service quality through its CRM framework, by gathering data on teaching dynamics, course facilities, and administrative services, has a demonstrable impact on student satisfaction and, in turn, their

loyalty. By addressing the research gap concerning the application of CRM in Saudi higher education (Rashed Alshareef et al., 2023), this study provides empirical evidence that a formal framework can effectively enhance institutional effectiveness and student outcomes. The results offer a practical model for other universities seeking to improve their student relationship strategies and build a skilled talent pool in alignment with national economic goals like Vision 2030 (Mohiuddin et al., 2023).

## 6 Theoretical and practical contributions

### 6.1 Theoretical contributions

This study makes several theoretical contributions to the field of higher education marketing and management. First, it empirically validates the causal link between CRM frameworks, student satisfaction, and student loyalty within the unique context of Saudi Arabian higher education. While previous research has explored these relationships in Western contexts, this study addresses a significant gap (Rashed Alshareef et al., 2023) by demonstrating their applicability and effectiveness in a region undergoing rapid socioeconomic and educational transformation (Mohiuddin et al., 2023).

Second, the study provides a practical application of the Krueger/Homp SOS framework by showing how a multi-tiered, data-driven CRM system integrates instructional activities, managerial functions, and supportive services (Hrnjic, 2016). By aligning survey feedback with specific KPIs, the research operationalizes how institutional effectiveness can be measured and improved through a student-centered approach.

Third, the present study indicates the practicality of using the combination of innovative computational techniques, such as sentiment analysis, topic modelling, and traditional survey analysis in educational studies. The study offers a more solid, sophisticated, and practical answer to qualitative student feedback by not using simple word counts but through latent theme extraction, which sets a methodological precedent in future studies.

Finally, by analysing alumni re-enrolment patterns, this research moves beyond attitudinal measures of loyalty (e.g., intention to re-enrol) to provide behavioral evidence of loyalty. The finding of a high postgraduate re-enrolment rate provides a tangible, real-world metric that reinforces the effectiveness of the institution's CRM efforts in building long-term student relationships (Rehman et al., 2022).

### 6.2 Practical contributions

The findings offer valuable practical guidance for higher education administrators in Saudi Arabia and beyond. The most significant contribution is the provision of a clear, replicable model for implementing a CRM framework. The university's system of leveraging diverse feedback mechanisms, from internal surveys and advisory boards to external employer evaluations, can be adopted by other institutions to systematically collect, analyse, and act on student feedback. This is a crucial element of a student-centered approach to education (Hrnjic, 2016).

One of the practical contributions is the illustration of the process of prioritizing institutional action effectively through topic modelling.

Rather than sorting through thousands of comments by hand, administrators can utilize this method to automatically detect and measure the most urgent student issues and thus allocate resources strategically to areas that have had the most significant impact on satisfaction, such as academic advising and lab modernization.

The study also highlights the importance of leveraging existing strengths to drive growth. The finding that the university successfully "cross-sells" its MBA program to engineering graduates demonstrates a smart, data-informed strategy for expanding postgraduate enrolment. This provides a blueprint for other universities to identify and capitalize on their most successful programs to increase brand loyalty and revenue. This strategy aligns with the principles of relationship marketing, where retaining existing "customers" is more cost-effective than acquiring new ones (Schertzer and Schertzer, 2004).

## 7 Limitations and future research agenda

### 7.1 Limitations

Despite its contributions, this study has several limitations. First, it is a single case study focused on one non-profit private university. While this approach allows for an in-depth analysis, the findings may not be generalizable to all higher education institutions in Saudi Arabia, particularly larger public universities with different operational models, funding structures, and student demographics.

Second, the sample size for the second survey was significantly smaller than the first, which limits the ability to make robust comparisons and draw firm conclusions about changes in student satisfaction over time. This discrepancy could be a result of survey fatigue or other factors. Future studies could use a more consistent methodology to ensure comparable sample sizes.

Lastly, the study utilized sentiment analysis and topic modelling, but the sentiment analysis was restricted to the lexicon-based analysis of TextBlob, which might not be robust enough to capture the cultural and linguistic context of the open-ended responses. Equally, the topic modelling, which was an informative tool, still involved manual interpretation of the created themes. Although the overall results were positive, a more complex analysis, such as a machine learning model trained on a culturally specific dataset, would be more informative.

### 7.2 Future research agenda

Building on the findings and acknowledging the limitations of the current study, several avenues for future research are recommended. First, comparative multi-group analyses should be conducted to evaluate the impact of CRM frameworks across different institutional types, such as public versus private and non-profit versus for-profit universities, within the Saudi Arabian context. This would help determine whether the observed outcomes are specific to the case study institution or generalizable across the sector. Additionally, longitudinal research tracking student cohorts from entry to graduation would offer valuable insights into how satisfaction and loyalty evolve over time, and which institutional touchpoints most significantly influence long-term engagement.

Second, future studies should adopt a mixed-methods approach that integrates qualitative techniques such as in-depth interviews or focus groups with students and alumni. It would enable more in-depth exploitation of the cognitive and emotional depth behind the themes that the topic modelling revealed, including the exact motivation behind the need to have better advising or facility updating. Moreover, research should extend beyond re-enrolment to examine other behavioral indicators of loyalty, including alumni donations, event participation, and advocacy through word-of-mouth. Investigating how specific CRM components, such as personalized advising, targeted communication, and digital engagement, affect these outcomes would provide a more holistic view of relationship management.

In addition, further studies can use more sophisticated Natural Language Processing (NLP) algorithms, including Aspect-Based Sentiment Analysis (ABSA), to directly correlate sentiments (e.g., frustration) to certain aspects of the student experience (e.g., lab equipment, advisor responsiveness) that are found using topic modelling. This would further generate an even more granular and actionable student feedback.

Finally, future research should explore how cultural factors unique to Saudi Arabia and the broader Gulf region shape student expectations and loyalty, thereby informing the development of culturally responsive CRM strategies tailored to local norms and values.

## Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

## Ethics statement

Ethical approval was not required for the study involving humans in accordance with the local legislation and institutional requirements. Written informed consent to participate in this study was not required from the participants or the participants' legal guardians/next of kin in accordance with the national legislation and the institutional requirements.

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