



The Role of Student Satisfaction in Mediating the Effect of Information System Quality, Information Quality, and Service Quality on Student Loyalty Among Working Adult Students at Pamulang University

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Abstract:

This study aims to analyze the effects of information system quality, information quality, and service quality on student satisfaction; the effects of these three variables on student loyalty; the effect of student satisfaction on student loyalty; and the mediating role of student satisfaction in the relationships between information system quality, information quality, and service quality and student loyalty among working adult students at Pamulang University. The study employed a quantitative approach using a survey method. The population comprised working adult students at Pamulang University who use the university's academic information system. A sample of 277 students was selected based on the criteria that participants were active working adult students who had used the university's academic information system. Based on the SEM-PLS analysis, seven of the ten proposed hypotheses were accepted, while three were rejected. Specifically, information system quality significantly affected student satisfaction ($\beta = 0.286$, $p < 0.001$), information quality significantly affected student satisfaction ($\beta = 0.318$, $p < 0.001$), and service quality significantly affected student satisfaction ($\beta = 0.351$, $p < 0.001$). Student satisfaction also significantly affected student loyalty ($\beta = 0.528$, $p < 0.001$). In contrast, the direct effects of information system quality on student loyalty ($\beta = 0.071$, $p = 0.225$), information quality on student loyalty ($\beta = 0.083$, $p = 0.153$), and service quality on student loyalty ($\beta = 0.096$, $p = 0.095$) were not statistically significant. The findings indicate that student satisfaction plays a pivotal role in linking information system quality, information quality, and service quality to student loyalty among working adult students at Pamulang University.

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Advances in information technology have prompted universities to improve the quality of



Introduction

academic service management through the use of integrated information systems. Academic information systems no longer serve merely as a means of data storage but have become the primary medium through which students obtain academic information, manage their coursework, access class schedules, view their academic records, make payments, and access various other academic services. Under these circumstances, the quality of information system has become a key factor in shaping students' experiences as users of higher education services. DeLone and McLean (2003) explain that the success of an information system can be evaluated across several key dimensions, including system quality, information quality, service quality, usage, user satisfaction, and net benefits. This model identifies user satisfaction as a critical indicator of an information system's success.

Information system quality relates to the system's ability to provide ease of use, reliability, access speed, flexibility, and security for users. For working students, information system quality is of even greater importance because their characteristics differ from those of regular students. Working students generally must balance their time between work, family, and coursework, so they require an academic information system that is easy to use, quickly accessible, stable, and capable of providing services efficiently. Thus, the better the quality of the information system students receive, the more likely they are to be satisfied with the services provided by the university.

Previous research provides empirical support for this relationship. Viola et al. (2024), through a study of 207 students at seven universities in Jambi City, found that system quality, information quality, and service quality significantly influence student satisfaction with e-learning. These findings indicate that the quality of technology and digital service is a crucial component in shaping a positive student experience. Consistent with these results, Zahra and Rahmah (2024) found that information quality and service quality have a positive and significant effect on student satisfaction, although system quality in that study showed a different direction of the relationship. These somewhat inconsistent findings suggest that the influence of each dimension of information quality on student satisfaction is still shaped by the characteristics of the system, the institution, and the users.

Information quality is also a crucial aspect in shaping student satisfaction. Accurate, relevant, complete, timely, and easy-to-understand information helps students gain certainty in carrying out their academic activities. Conversely, information that is delayed, incomplete, or inaccurate can create uncertainty and erode students' trust in the system and the institution. A study by Dangaiso, Makudza, and Hogo (2022) involving 354 college students in Zimbabwe found that system quality, information quality, and service quality are positively and significantly associated with student satisfaction, while student satisfaction also has a positive effect on student loyalty. This study provides evidence that the quality of electronic-based services is not only related to satisfaction but also has implications for student loyalty.

In addition to system quality and information quality, service quality is a crucial factor in fostering student satisfaction. Service quality reflects a university's ability to provide assistance, responsiveness, reliability, and service tailored to users' needs. In the context of working students, responsive service becomes increasingly important because these students have limited time and require quick and flexible resolution of academic administrative matters. Research by Dayanti and Ilham (2022) on e-learning users at higher education institution in East Java showed that the quality of e-learning services influences student satisfaction and loyalty. The study also found that student satisfaction influences student loyalty, suggesting that satisfaction can serve as a key mechanism linking service quality to loyalty.

Student loyalty is a strategic aspect for the sustainability of higher education institutions because students who have positive experiences and feel satisfied tend to maintain their relationship with the institution, recommend the university to other, and are more likely to continue their education at the same institution. Research by Luthfiana, Sujarwoto, and Said (2025) reinforces this argument. The study, conducted at the Faculty of Engineering, Jakarta State University, used PLS-SEM and found that the university's service quality has a positive and significant effect on both student satisfaction and loyalty. Furthermore, student satisfaction was found to act as a partial mediator in the relationship between service quality and student loyalty. These findings indicate that loyalty is not formed solely by service quality directly but also through students' subjective evaluation of the satisfaction they experience.

Although recent studies have provided empirical evidence regarding the relationships among information system quality, information quality, service quality, student satisfaction, and student loyalty, several gaps remain. First, the empirical findings are not fully consistent across studies. Viola et al. (2024) found that system quality, information quality, and service quality significantly influence student satisfaction, whereas Zahra and Rahmah (2024) reported positive and significant effects of information quality and service quality but a different direction of the relationship for system quality. This inconsistency indicates that the effect of each quality dimension may depend on the characteristics of the system, institution, and users being studied and therefore requires further examination.

Second, recent studies have generally examined these relationships within the context of e-learning or among students in general. Viola et al. (2024) focused on student satisfaction with e-learning, Dangaiso, Makudza, and Hogo (2022) examined college students in the context of electronic-based services, and Dayanti and Ilham (2022) investigated e-learning users in higher education institutions. Meanwhile, Luthfiana, Sujarwoto, and Said (2025) examined the relationship between university service quality, student satisfaction, and loyalty at the Faculty of Engineering, Jakarta State University. These studies demonstrate the importance of service and information system quality in shaping satisfaction and loyalty; however, they do not specifically focus on working adult students who face different conditions from regular students because they must balance academic responsibilities with employment and, in many cases, family responsibilities.

Third, previous studies have often examined quality dimensions and loyalty within specific service contexts or have emphasized only certain relationships among the variables. There is still a need for an integrated model that simultaneously distinguishes information system quality, information quality, and service quality as separate antecedents of both student satisfaction and student loyalty. Such an approach is important because these three dimensions represent different aspects of students' experiences: the technical performance of the system, the quality of the information produced, and the quality of support and services provided by the institution.

Based on these gaps, this study offers novelty by positioning student satisfaction as a mediating variable in the relationship between information system quality, information quality, and service quality and student loyalty, with a specific focus on working adult students at Pamulang University. The study therefore examines not only whether the three quality dimensions directly influence student loyalty but also how these relationships may operate through student satisfaction. By focusing on working students and integrating the three quality dimensions within one model, this study is expected to provide a more specific understanding of the mechanisms through which academic information systems and institutional services contribute to student loyalty. Thus, the study is also expected to extend the application of the DeLone and McLean Information System Success Model in the higher education context, particularly among students who hold dual roles as workers and students.

Based on the above description, this study aims to analyze the influence of information system quality, information quality, and service quality on student satisfaction; analyze the influence of these three variables on student loyalty; analyze the influence of student satisfaction on student loyalty; and test the mediating role of student satisfaction in the relationship between information system quality; information quality; and service quality and the loyalty of working students at Pamulang University. Conceptually, this study is expected to contribute to the development of literature on the success of information systems in higher education institutions, while practically, the research findings can serve as a basis for Pamulang University to improve the quality of its academic information systems and digital services to foster student satisfaction and loyalty among its working-adult student.

Literature Review

1. Information System Quality

Information system quality (system quality) refers to the technical characteristic or qualities of an information system that indicate the extent to which the system is capable of providing the functions users need in an easy, fast, flexible, reliable, and convenient manner. In DeLone and McLean's information system success model, system quality is one of the three primary quality dimensions that influence user adoption and satisfaction. In the context of working student at Pamulang University, information system quality can be understood as the academic system's ability to provide access to academic services in a way that is easy, stable, fast, and tailored to the needs of students who juggle both work and coursework. Research by Viola et al.(2024) also shows that system quality has a significant effect on student satisfaction with e-learning. Based on DeLone and McLean(2003) and the operationalizations commonly used in information systems research, indicators of information system quality may include: (1) ease of use, (2) system speed/response time, (3) reliability, (4) flexibility, and (5) integration.

2. Information Quality

Information quality refers to the level of quality of the information output generated by an information system, such that users can use that information appropriately to meet their needs and make decisions. DeLone and McLean(2003) identify information quality as one of the key dimensions of information system success, alongside system quality and service quality. High-quality information must be accurate, relevant, complete, timely, and presented in an easily understandable format. In the context of working students, information quality is crucial because information regarding class schedules, payments, grades, attendance, the academic calendar, and other administrative matters must be received accurately and in a timely manner, given that these students have limited time to access academic services. Viola et al.(2024) found that information quality significantly influence student satisfaction with e-learning. Therefore, the indicators of information quality that can be used in this study are (1) accuracy, (2) relevance, (3) completeness, (4) timeliness, and (5) information format.

3. Service Quality

Service quality refers to the ability of an information system provider to deliver services,

assistance, support, and responses that meet user needs. In the model proposed by DeLone and McLean(2003), service quality is a critical dimension of information system success because users evaluate not only the technical quality of the system and the system. In the context of higher education, service quality is reflected in the university's ability to provide responsive, reliable service; guarantee problem resolution; and understand students' needs. This is particularly important for working students who require fast and flexible academic services. Research by Viola et al.(2024) demonstrates that service quality significantly influences student satisfaction with e-learning. Based on the perspective of DeLone and McLean(2003) and the "characteristic of information systems, the service quality indicators in this study may include (1) responsiveness, (2) assurance, (3) empathy, (4) reliability.

4. Student Satisfaction

Student satisfaction is the level of positive feelings that arise after students compare their experiences and the performance of the service they receive with their expectations or needs. In the DeLone and McLean (2003) model, user satisfaction is one of the key construct of information system success and is related to system quality, information quality, and service quality. In higher education research, student satisfaction reflects student' evaluation of their experience using the system and receiving academic services. Viola et al (2024) demonstrated experience that system quality, information quality, and service quality significantly influence student satisfaction with e-learning. Satisfaction also holds a strategic position in this study as it serves as a mediating variable that explains how information system quality, information quality, and service quality can foster student loyalty. Based on the concept of user satisfaction in DeLone and McLean(2003), indicators of student satisfaction may include (1) satisfaction with the system, (2) alignment with expectations, (3) fulfillment of needs, and (4) overall user experience.

5. Student Loyalty

Student loyalty refers to students' commitment to maintaining a relationship with their institution, as reflected in their willingness to continue using its service, recommend the institution to others, and maintain ties with it. Loyalty is important for institutions because students who have positive experiences and high levels of satisfaction tend to have a stronger attachment to their institution. Hennig-Thurau, Langer, and Hansen (2001) developed the concept of student loyalty as a form of student commitment to an educational institution, while research by Dangaiso et al.(2022) found that the quality of e-learning services is associated with student satisfaction and loyalty. This research indicates that student satisfaction has a positive relationship with student loyalty. Furthermore, Dayanti and Ilham(2022) also found that quality of e-learning services influence student loyalty through student satisfaction. Thus, loyalty in this study is understood not only as the desire to remain a student but also as positive student behavior toward the institution. Indicators of student loyalty may include (1) the intention to

continue the relationship with the university (retention intention), (2) the willingness to recommend the university (recommendation), (3) preference for the university (preference), and (4) the intention to use the university's service again (repurchase/reuse intention).



Method

This study employs a quantitative approach using a survey method to analyze the role of student satisfaction in mediating the effects of information system quality, information quality, and service quality on the loyalty of working-student students at Pamulang University. The population for this study consists of working-student student at Pamulang University who use academic information system. The research sample consisted of 277 student, selected based on criteria of being active working-student program students who had used the university's academic information system. Data collection was conducted via a questionnaire using a 1-5 Likert scale, ranging from 1 = strongly disagree to 5 = strongly agree. The research variables consist of information system quality (X1), information quality (X2), service quality (X3), student satisfaction (Z) as the mediating variable, and student loyalty (Y) as the dependent variable.

The research instrument was developed based on indicators from relevant previous studies and was then tested using the " " measurement model (outer model) to determine construct validity and reliability. The outer model testing included outer loadings, Average Variance Extracted (AVE), Cronbach's Alpha and composite reliability. Next, the inner model was tested to determine the relationship among the variables using the R-squared (R^2) value, path coefficients, effect size (f^2), and predictive relevance (Q^2). Hypothesis testing was conducted using the bootstrapping method in the SmartPLS software, examining path coefficients, t-statistic, and p-values was < 0.05 at a 5% significance level. The mediation effect was tested by analyzing the specific indirect effect to determine whether student satisfaction mediates the influence of information system quality, information quality, and service quality on student loyalty.



Result

Based on the results of the measurement model (outer model) testing conducted previously—in which all indicators were found to be valid and reliable—the net step is to test the structural model (Inner Model) to test the research hypothesis. This test aims to analyze the role of student satisfaction in mediating the effect of information system quality, information system quality, and service quality, information quality, and service quality on the loyalty of part-time students at Pamulang University. The research hypotheses will be tested using the bootstrapping method in the SmartPLS application to obtain path coefficients the, t-statistics, and p-values, which will serve as the basis for deciding whether to accept or reject the hypotheses.

Table 1. Table of Test Results s (Direct Effects)

Hypothesis	Path Coefficient	p-value	95% Confidence Interval for the WE Path Coefficient		F-squared
			Lower Limit	Upper Limit	
KSI→ KM	0.286	0.000	0.210	0.405	0.157
→ KM	0.318	0.000	0.123	0.392	0.071
KL→ KM	0.351	0.000	-0.047	0.176	0.013
KSI→ LM	0.071	0.225	0.158	0.442	0.077
→ LM	0.083	0.153	0.056	0.221	0.047
KL→ LM	0.096	0.095	0.215	0.421	0.143
KM→ LM	0.528	0.000	0.392	0.613	0.438

H1 : Information Systems Quality Affects Student Satisfaction

The test result show that information system quality has a positive and significant effect on student satisfaction. The patch coefficient od 0.286, the t-statistic of 4.327, and the p-value of 0.000 indicate that the better the quality of the information system used by students, the higher their level of satisfaction. Thus, H1 is accepted.

These findings indicate that working students require an information system that is user-friendly, fast, stable, and reliable to support their academic activities. Working students must balance their work responsibilities with their coursework; therefore, a simple and easily accessible information system can reduce the time and effort required to access academic services. These research results align with those of Viola et al. (2024), who found that system quality significantly influences student satisfaction with e-learning. These findings also support DeLone and McLean (2003), who identified system quality as one of the primary determinants of user satisfaction with information systems.

H2 : Information Quality Influences Student Satisfaction

The test results indicate that information quality has a positive and significant effect on student satisfaction, with a path coefficient of 0.318, a *t-statistic* of 5.012, and a *p-value* of 0.000. These results show that the more accurate, relevant, complete, and timely the information provided by the academic information system is, the higher the students' satisfaction. Thus, H2 is accepted. This can be explained by the fact that students need reliable academic information to support their coursework. Information regarding schedules, grades, attendance, payments, the academic calendar, and other administrative matters must be available accurately and in a timely manner. Inaccurate information can cause uncertainty and inconvenience for students. These results align with those of DeLone and McLean (2003) and the study by Viola et al. (2024), which show that information quality is a key factor in shaping user satisfaction with information systems.

H3 : Service Quality Influences Student Satisfaction

Service quality was found to have a positive and significant effect on student satisfaction, with a path coefficient of 0.351, a *t-statistic* of 5.684, and a *p-value* of 0.000. These values indicate that service quality has the strongest influence on student satisfaction compared to information system quality and information quality. Therefore, H3 is accepted.

These findings suggest that student satisfaction is determined not only by the quality of technology but also by how higher education institutions provide assistance and services to students. Prompt responses to academic questions or problems, the provision of clear information, and staff members' ability to resolve issues can create a positive service experience.

These findings support the research by Dayanti and Ilham (2022) and Viola et al. (2024), which demonstrate a positive relationship between service quality and student satisfaction.

H4 : Information System Quality Does Not Affect Student Loyalty

The test results indicate that the quality of the information system does not have a significant direct effect on student loyalty. A path coefficient of 0.071, a *t-statistic* of 1.214, and a *p-value* of 0.225 indicate that H4 is rejected.

This finding suggests that a good information system does not necessarily make students loyal to Pamulang University. Students may view the information system as a basic facility that should be available and function properly. In other words, the system's ease of use and reliability are not sufficient to foster students' desire to maintain their relationship with the university, recommend it to others, or choose it again.

These results are intriguing because the quality of the information system was actually found to have a significant effect on student satisfaction in H1. This means that the influence of system quality on loyalty may occur through student satisfaction. This finding highlights the importance of distinguishing between **satisfaction—as an evaluation of the experience of using the system**—and **loyalty—as a form of long-term relationship between students and the institution**.

H5 : Information Quality Does Not Affect Student

The test results show that information quality does not have a significant direct effect on student loyalty. A path coefficient of 0.083, a *t-statistic* of 1.431, and a *p-value* of 0.153 indicate that H5 is rejected.

These results indicate that accurate and complete information does not automatically lead to student loyalty. Academic information is essentially a basic necessity in the educational process. Students need accurate information to carry out their academic activities, but the quality of information alone is not sufficient to foster a strong commitment to the university.

These results suggest that students first evaluate the quality of information based on their perceived satisfaction. When the information received aligns with their needs and expectations, students feel satisfied, and this satisfaction can subsequently foster loyalty. Therefore, the influence of information quality on loyalty is best understood through the mechanism of student satisfaction.

H6 : Service Quality Doe Not Affect Student Loyalty

Service quality was also found to have no significant direct effect on student loyalty. The test results showed a path coefficient of 0.096, a *t-statistic* of 1.672, and a *p-value* of 0.095. Since the *t-statistic* is less than 1.96 and the *p-value* is greater than 0.05, H6 is rejected.

These findings indicate that good service does not directly lead to high student loyalty. Service quality can help students feel supported and satisfied in meeting their academic needs, but loyalty requires a more comprehensive evaluation of students' experiences during their interactions with the university.

The results of this study differ from some of the findings of Dayanti and Ilham (2022) and Luthfiana et al. (2025), which demonstrated a relationship between service quality and loyalty. These differences in results may be due to respondent characteristics and the research context. This study specifically focused on working students, who have different needs and interaction patterns compared to regular students. For working students, service quality likely first leads to satisfaction before eventually developing into loyalty.

H7 : Student Satisfaction Influence Student Loyalty

The results indicate that student satisfaction has a positive and significant effect on student loyalty. A path coefficient of 0.528, a *t-statistic* of 8.421, and a *p-value* of 0.000 indicate that student satisfaction is a key factor in shaping loyalty. Thus, H7 is accepted.

The coefficient value of 0.528 is the largest coefficient in the direct relationship leading to loyalty. This indicates that students who are satisfied with the information system, academic information, and services provided are more likely to maintain their relationship with the university, recommend the university, and reuse the available services. These findings are consistent with Dangaiso et al. (2022), who found a positive relationship between student satisfaction and student loyalty, as well as Dayanti and Ilham (2022), who demonstrated that student satisfaction plays a role in shaping loyalty.

Table 2. Test Results (*Indirect Effect*)

Hypothesis	Path Coefficient	p-value	95% Confidence Interval for Path Coefficient		Variance Explained
			Lower Bound	Upper Bound	
KSI→ KM→ LM	0.151	0.000	0.015	0.081	0.015
KI→ KM→ LM	0.168	0.000	0.074	0.221	0.558
KM→ KL→ LM	0.185	0.000	0.030	0.156	1.631

H8 : Student Satisfaction Mediates the Effect of Information System Quality on Student Loyalty

The results of the indirect effect test indicate that student satisfaction mediates the effect of information system quality on student loyalty. An indirect effect value of 0.151, a *t-statistic* of 3.964, and a *p-value* of 0.000 indicate that the mediating effect is significant. Thus, H8 is accepted. This finding provides an important explanation for the results of H4, which showed that information system quality does not have a direct effect on loyalty. Information system quality first increases student satisfaction, and that satisfaction then increases loyalty. Thus, student satisfaction acts as a mechanism that bridges the relationship between information system quality and loyalty. This indicates that a good information system must be able to generate positive experiences in order to have an impact on student loyalty.

H9 : Student Satisfaction Mediates the Effect of Information Quality on Student Loyalty

The test results show that student satisfaction significantly mediates the effect of information quality on student loyalty. The indirect effect value is 0.168, the *t-statistic* is 4.431, and the *p-value* is 0.000. Thus, H9 is accepted.

These results indicate that high-quality information does not directly foster student loyalty but first generates satisfaction. When students receive accurate, relevant, complete, and timely information, they have a better academic experience. This experience increases satisfaction, which in turn drives loyalty. This finding reinforces the perspective of DeLone and McLean (2003) that information quality is a key determinant of user satisfaction with information systems.

H10 : Student Satisfaction Mediates the Effect of Service Quality on Student Loyalty

The test results indicate that student satisfaction mediates the effect of service quality on student loyalty. The indirect effect value is 0.185, the *t-statistic* is 4.972, and the *p-value* is 0.000. Thus, H10 is accepted.

The indirect effect value of 0.185 represents the largest mediating effect compared to the mediating effects of information system quality and information quality. This indicates that the quality of service provided by the university plays a crucial role in shaping satisfaction, which in turn leads to student loyalty. For working students, fast, responsive service that understands their needs is particularly important, as they must manage the demands of both work and their studies simultaneously.



Discussion

The SEM-PLS results show that information system quality, information quality, and service quality have positive and significant effects on student satisfaction, with path coefficients of 0.286 ($t = 4.327$), 0.318 ($t = 5.012$), and 0.351 ($t = 5.684$), respectively. Service quality has the strongest effect on satisfaction. This finding indicates that working adult students particularly value responsive and solution-oriented academic services because their study activities must be managed alongside work responsibilities.

In contrast, the direct effects of information system quality, information quality, and service quality on student loyalty are not significant. The absence of significant direct effects suggests that the availability of a functional information system, accurate information, and adequate services alone is insufficient to create loyalty. For working adult students, these qualities may be perceived as basic requirements of the university rather than unique benefits that independently determine whether students remain loyal. Loyalty is more likely to emerge when these quality dimensions generate a positive and satisfying overall student experience.

This interpretation is supported by the significant relationship between student satisfaction and student loyalty. Student satisfaction has the strongest direct effect in the model, with a path coefficient of 0.528 ($t = 8.421$). Thus, students who are satisfied with the academic information system and related services are more likely to maintain their relationship with the university and recommend it to others. The result also explains why the quality variables can contribute to loyalty through satisfaction even though their direct effects are not significant.

The mediation results further demonstrate that student satisfaction functions as a full mediator between the three quality dimensions and student loyalty. The indirect effect of service quality on loyalty is the largest (0.185), followed by information quality (0.168) and information system quality (0.151). These results indicate that improvements in service, information, and system quality are translated into loyalty primarily when they increase student satisfaction. In other words, satisfaction is the mechanism that converts perceived quality into a stronger and more sustainable relationship with the university.

The findings are consistent with the general logic of information-system and service-quality research, in which perceived quality first shapes users' evaluations and satisfaction before contributing to behavioral outcomes such as loyalty. The present study extends this pattern to working adult students at Pamulang University by showing that satisfaction is particularly important in explaining loyalty. The stronger indirect effect of service quality also highlights the importance of human support and responsiveness for students who must balance academic and professional commitments.

Overall, the findings provide a clear explanation for the difference between the non-significant direct effects and significant mediation effects. Information system quality, information quality, and service quality do not automatically produce loyalty; instead, their contribution to loyalty is realized through student satisfaction. Therefore, the university should not focus only on maintaining reliable systems, accurate information, and adequate services, but should continuously evaluate whether these resources create a convenient, responsive, and

satisfying academic experience for working adult students.



Conclusion

The SEM-PLS results show that seven of the ten proposed hypotheses are accepted and three are rejected. H4, H5, and H6, concerning the direct effects of information system quality, information quality, and service quality on student loyalty, are rejected, while H1, H2, H3, H7, H8, H9, and H10 are accepted. The main finding is that student satisfaction fully mediates the effects of information system quality, information quality, and service quality on the loyalty of working adult students at Pamulang University.

Practically, the university should prioritize improvements that strengthen student satisfaction, particularly responsive academic services, accurate and useful information, and a reliable academic information system. Regular evaluation of student experience can help ensure that improvements in these quality dimensions are translated into stronger student loyalty.



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