Loyalty in Digital Learning: Exploring Service Quality, Satisfaction, and Trust in Open Flexible Distance Education

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Abstract
In the rapidly changing field of higher education, global events have expedited the acceptance of online distance learning, leading to a crucial emphasis on assessing students' loyalty. In the context of Malaysian higher education institutions, there is a constant need for adaptation and innovation in online education to attract, retain, and assure student loyalty and success in this changing landscape. The purpose of this study is to evaluate the immediate effect of service quality, trust, and satisfaction on students' loyalty in online distance learning higher education institutions. The findings of a systematic survey conducted with 5051 individuals enrolled in online distance-learning higher education institutions reveal that trust had the most significant impact on loyalty, followed by satisfaction and service quality. These factors demonstrate their relative importance in determining students' loyalty within the distinct context of online distance-learning higher education institutions, aligning with the principles of the Expectancy-Confirmation Model (ECM). The results underscore the need to use specific

strategies to enhance student satisfaction, trust, and service quality, with a special focus on improving satisfaction primarily in online open distance learning higher education settings.
Keywords: Service Quality, Satisfaction, Trust, Loyalty, Online Flexible Distance Education

Introduction
In the ever-evolving realm of higher education, global events have accelerated the adoption of online distance learning, prompting a critical focus on evaluating students' loyalty (Mulyono et al., 2020). This assessment encompasses their commitment, satisfaction, and intent to persist in the digital learning sphere, where the quality of the online learning experience is paramount (Latif et al., 2021). Institutions fostering interactive content, effective communication, and robust support mechanisms witness heightened student loyalty (Alkraiji & Ameen, 2022). Conversely, technical issues, a lack of personal connection, and insufficient academic support contribute to dropout rates, undermining student allegiance (Subandi & Hamid, 2021).

In Malaysia, higher education is undergoing a significant transformation with the increasing prevalence of online distance learning. The evaluation of students' loyalty is crucial in this context, with the quality of the online learning experience emerging as a key factor (Ong & Ramasamy, 2024). Institutions prioritizing interactive content and effective communication foster higher levels of student loyalty (Abdullah et al., 2023). Challenges, such as technical issues and a lack of personal connection, pose threats to loyalty (Jie et al., 2023). Emerging trends involve integrating advanced technologies like artificial intelligence and virtual reality to enhance the online learning environment (Ibrahim et al., 2022). Additionally, creating virtual communities and fostering peer interactions play a crucial role in building a sense of belonging and student loyalty (Dangasio et al., 2022). Malaysian higher education institutions must adapt and innovate continuously in online education to attract, retain, and ensure the loyalty and success of students in this dynamic landscape (Mohammed et al., 2023).

The study on students' loyalty to online distance learning in Malaysia holds paramount significance for policymakers, online institutions, and students. Policymakers gain insights for shaping effective educational policies and creating an environment conducive to quality online learning experiences. Online institutions can enhance student loyalty by prioritizing interactive content, effective communication, and robust support mechanisms (Latif et al., 2022). Integrating advanced technologies and emphasizing virtual communities becomes strategic for competitiveness. Students benefit by making informed choices and understanding the importance of institutions prioritizing a quality online learning experience. The study guides policy decisions, informs institutional strategies, and empowers students, contributing to the overall enhancement of Malaysia's online higher education landscape. Furthermore, the study's insights are invaluable for policymakers as they strive to create policies that foster a conducive online learning environment and address the evolving needs of students in Malaysia. Understanding and implementing the findings for online institutions can lead to a competitive edge in attracting and retaining students. Moreover, students, armed with this knowledge, gain a better understanding of the factors influencing their educational journey, enabling them to make informed decisions for a more enriching and successful online learning experience. In essence, this study serves as a comprehensive guide for all stakeholders, playing a pivotal role in shaping the future of online distance learning in Malaysian higher education. The focus of this study is:

- to assess the direct influence of service quality, trust, and satisfaction on students' loyalty in online distance learning higher education institutions.

Literature Review
Underpinning Theory
The Expectancy-Confirmation Model (ECM) (Oliver, 1980) provides a valuable framework for understanding the intricate dynamics among satisfaction, trust, service quality, and students' loyalty in the context of online distance-learning higher education institutions. At its core, the ECM posits that individuals form expectations about a service or product and subsequently confirm or disconfirm these expectations through their actual experiences. In the realm of online education, students enter into a learning environment with certain expectations regarding service quality, the trustworthiness of the platform, and the overall learning experience. These expectations act as a foundational element influencing their initial satisfaction with the educational service. As students progress through their online courses, their experiences either validate or challenge these preconceived expectations, leading to confirmation or disconfirmation. The confirmation or disconfirmation of expectations significantly impacts satisfaction levels. In the educational context, students who find their expectations met or exceeded are likely to experience higher satisfaction, fostering a positive feedback loop. This positive relationship between confirmation, satisfaction, and loyalty aligns with the ECM's central tenets. Moreover, the ECM underscores the role of satisfaction as a critical mediator between students' experiences, their initial expectations, and subsequent loyalty to the online learning platform. If students are satisfied with the service quality, trustworthiness, and overall learning experience, they are more inclined to develop a sense of loyalty, committing to continued engagement and enrollment.

Relationship between Satisfaction & Loyalty
The intricate interplay between students' satisfaction and their loyalty is a cornerstone of the educational landscape, shaping the dynamics of institutional success and student engagement (Dangaiso et al., 2022). Students' satisfaction, rooted in their perception of the quality of education, support services, and overall experience, serves as a crucial determinant of their loyalty toward an educational institution (Musa et al., 2023). When students feel satisfied with their educational experience, they are more likely to develop a sense of allegiance and commitment, fostering deep-rooted loyalty (Osman et al., 2024). This loyalty may manifest in various forms, including continued enrollment, active participation in campus activities, and positive advocacy within their social circles (Todea et al., 2022). Conversely, dissatisfaction can erode students' loyalty, leading to disengagement, attrition, and potentially negative word-of-mouth. Therefore, institutions must prioritize understanding and addressing students' needs and concerns to enhance satisfaction levels and cultivate lasting loyalty (Song, 2022). By consistently exceeding expectations, providing responsive support services, and fostering a supportive learning environment, educational providers can bolster students' satisfaction and, consequently, their loyalty (Ong & Ramasamy, 2024). In this symbiotic relationship, students' satisfaction acts as a precursor and catalyst for the development of enduring bonds between students and their educational community, fostering a mutually beneficial cycle of growth, success, and mutual support (Al Hassani & Wilkins, 2022). Hence, the following hypothesis was proposed for this study:

H1: There is a relationship between students' satisfaction and students' loyalty in online distance learning higher education institutions

Relationship between Service Quality & Loyalty
The relationship between service quality and students' loyalty encapsulates a pivotal aspect of the educational experience, where the provision of exceptional services intertwines with the cultivation of enduring loyalty (Nguyen et al., 2024). Service quality acts as the cornerstone upon which students build their perception of an educational institution, encompassing aspects such as teaching effectiveness, administrative support, facilities, and overall experience. When students perceive high service quality, they develop a sense of trust and satisfaction, feeling valued and supported in their academic journey (Suranta & Rahmawati, 2024). This satisfaction forms the foundation upon which loyalty is constructed. Students who receive exceptional service are more inclined to exhibit loyalty towards their educational institution, manifesting in various forms such as continued enrollment, positive word-of-mouth endorsements, and active engagement in extracurricular activities (Trisela, 2022). Conversely, subpar service quality can lead to dissatisfaction and disengagement, resulting in diminished loyalty and potentially, attrition. Thus, institutions must prioritize delivering exemplary service to cultivate a loyal student base (Sebopelo & Agolla, 2023). By consistently exceeding expectations and addressing students' needs with diligence and empathy, educational providers can foster a culture of loyalty, where students not only thrive academically but also become ambassadors for the institution, fostering a cycle of excellence and growth (Mohammed et al., 2022). In this symbiotic relationship, catalyzes the catalyst for nurturing enduring bonds between students and their educational community, laying the groundwork for mutual success and prosperity (Khankuni et al., 2023). Thus, the following hypothesis was proposed for this study:

H2: There is a relationship between service quality and students' loyalty in online distance learning higher education institutions

Relationship between Trust & Loyalty
In the intricate web of educational dynamics, the symbiotic relationship between students' trust and students' loyalty weaves a tapestry of academic cohesion and personal growth (Safitri & Nurwulandari, 2022). Trust, the cornerstone of any meaningful connection, forms the bedrock upon which loyalty flourishes. When students trust their educators, institutions, and peers, they feel secure in their learning environment, fostering a sense of belonging and psychological safety. This trust creates a fertile ground where loyalty can take root and thrive (Khan et al., 2023). Loyalty, in turn, manifests as a steadfast commitment to the educational journey, characterized by dedication, support, and allegiance. Students who feel trusted are more likely to reciprocate that trust with unwavering loyalty, engaging wholeheartedly in their studies, participating actively in classroom discussions, and championing the values of their academic community (Rew et al., 2023). Conversely, a lack of trust can erode loyalty, leading to disengagement, apathy, and detachment from the learning process. Thus, cultivating trust among students is not merely a precursor but a catalyst for fostering loyalty, nurturing a harmonious ecosystem where mutual respect and support propel individuals toward academic excellence and personal fulfilment (Snijders et al., 2022). In this intricate dance between trust and loyalty, students emerge not only as learners but as active contributors to a vibrant educational community, united by their shared commitment to

growth and success (Elista et al., 2022). Therefore, the following hypothesis was proposed for this study:

H3: There is a relationship between students' trust and students' loyalty in online distance learning higher education institutions

Figure 1: Specified Model
Note: RES=Responsiveness   TAN=Tangible   REL=Reliability=Reliability   AS=Assurance
EMP=Empathy   SQ=Service Quality   SAT=Satisfaction   TRU=Trust   LOY=Loyalty

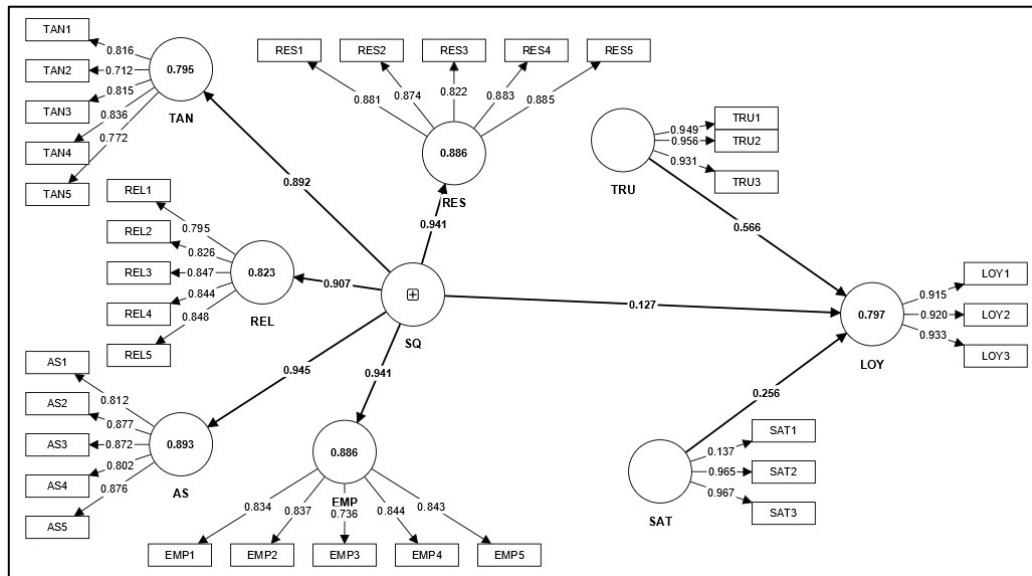Figure 2: Respecified Model
Note: RES=Responsiveness   TAN=Tangible   REL=Reliability=Reliability   AS=Assurance
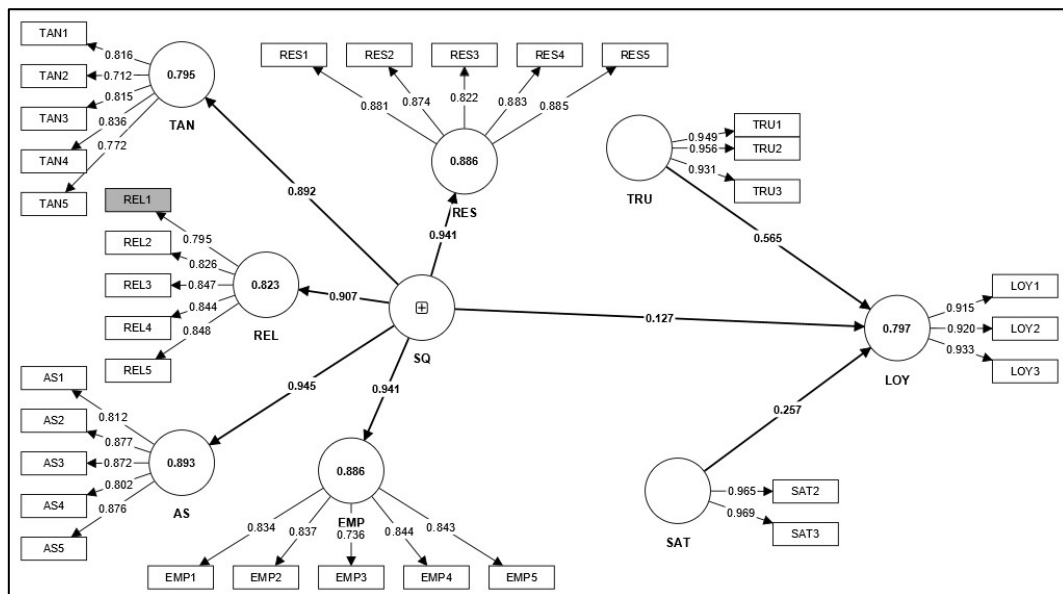*EMP=Empathy   SQ=Service Quality   SAT=Satisfaction   TRU=Trust   LOY=Loyalty*

Methodology
This research concentrated on individuals enrolled in online distance-learning higher education institutions. Primary data were gathered through survey instruments, and the

survey questionnaire employed in the study was meticulously crafted based on prior research to ensure its reliability and validity. A non-probabilistic snowball sampling method was utilized, and participants received the survey questionnaire via email. The survey encompassed 34 observed variables, including both exogenous and endogenous measurements. Exogenous variables covered constructs like service quality Parasuraman et al (1988), satisfaction Adnan et al (2016), and trust Cronin & Taylor (1992), with measurement items adapted from established studies. Loyalty (Evanschitzky & Wunderlich, 2006) served as the endogenous variable, and both were evaluated using specific measurement items. Respondents rated each measurement item on a five-point Likert scale, ranging from "strongly disagree" to "strongly agree." Out of the 6015 distributed questionnaires, 5118 were collected, resulting in an 85.1% response rate. Following data screening and outlier removal, 5051 questionnaires remained for analysis. For data analysis and hypothesis testing, Smartpls4 software was employed, utilizing structural equation modeling (SEM) techniques. The choice of this software was based on its evaluation capabilities and suitability for multivariate data analysis. Furthermore, model measurement and structural model evaluation procedures adhered to the guidelines proposed by Ringle et al. (2022), with Smartpls4 facilitating these assessments. The comprehensive capabilities of Smartpls4 allowed researchers to conduct thorough multivariate data analysis and effectively test the proposed hypotheses, aligning with the study's objectives.

Data Analysis
Respondents' Profiles
The provided table presents the demographic distribution of participants based on three categorical variables: Gender, YrStudy (Year of Study), and Faculty. In terms of Gender, the majority of participants are Female, constituting 71.3% of the total sample, while Males make up 28.7%. This gender distribution indicates a significant gender imbalance within the sample, with a notable majority of female participants. Examining the variable YrStudy (Year of Study), the majority of participants are in their first year of study (56.0%), followed by those in the second year (17.0%). The variable Faculty reveals the distribution of participants across different faculties. The Faculty of Education (FOE) has the highest representation with 45.4%, followed by the Faculty of Business and Management (FBM) at 24.9%. The Faculties of Arts and Social Sciences (FSSH) and Applied Sciences (FTAS) constitute 9.3% and 20.4%, respectively. This distribution highlights the diverse representation of participants across various academic disciplines, with education having the largest share.

Common Method Bias
Kock (2015); Kock & Lynn (2012) introduced an extensive approach known as the collinearity test, designed for assessing both vertical and horizontal collinearity. The identification of problematic collinearity relies on variance inflation factors (VIFs) surpassing 3.3, which signals a common method bias challenge within the model. Consequently, if the VIFs obtained from the total collinearity assessment are below 3.3, it is inferred that the model is free from common method bias. In Table 1, the VIFs resulting from the total collinearity examination are below 3.3, affirming the absence of any common method bias issue in the model.

Reflective Model Measurement
This study applied the approach recommended by Hair et al (2017) to assess each measurement in both the first and second orders. This methodology facilitates the

identification of items with loadings below the critical threshold of 0.7. Initially, the specified model was introduced (Figure 1), revealing construct reliability and validity results indicating that certain items exhibited loadings less than 0.7 and were not significant. This led to Average Variance Extracted (AVE) values for leadership style and perceived behavioral control falling below the threshold of 0.5. Following the removal of problematic items with loadings less than 0.7, the model was re-specified (Figure 2). The revised construct reliability and validity assessments demonstrated that the AVE for all constructs exceeded 0.5 (Table 2), ranging from 0.851 to 0.935, signifying the establishment of convergent validity (Hair et al., 2017). Composite reliability for all constructs remained above 0.7, ranging from 0.915 to 0.942. Furthermore, the Cronbach alpha values for all constructs exceeded 0.7, ranging from 0.913 to 0.941 (Table 2). To establish discriminant validity, the first step involved evaluating cross-loadings to ensure the proper representation and measurement of each item within its respective construct (Table 3). Subsequently, discriminant validity was further assessed using the Hetrotrait-Monotrait (HTMT) ratio, a recommended criterion for examining discriminant validity in Variance-Based Structural Equation Modeling (VB-SEM) (Henseler, Ringle & Sarstedt, 2015). Table 4 presented the HTMT ratios for the constructs, along with the original sample and 95% confidence intervals (two-tailed), confirming compliance with discriminant validity based on the HTMT threshold of 0.85. The bias-corrected and accelerated bootstrap confidence intervals were found to be below 1, indicating that the upper limit of the intervals remained within a favorable range. This analysis reinforced confidence in the distinctiveness of the constructs and their capacity to measure different aspects of the investigated phenomenon.

Table 1
Full Collinearity Test

	MLOY	MSQ	MSAT	MTRU
MLOY		3.150	3.175	2.842
MSQ	3.207		3.023	3.102
MSAT	1.736	1.595		1.785
MTRU	2.847	3.090	3.197	

Table 2
Construct Reliability & Validity

	CA	CR	AVE
LOY	0.913	0.915	0.851
SAT	0.931	0.932	0.935
TRU	0.941	0.942	0.894

Table 3

Cross Loadings

	AS	EMP	LOY	REL	RES	SAT	TAN	TRU
AS1	**0.812**	0.714	0.591	0.646	0.671	0.615	0.606	0.602
AS2	**0.877**	0.741	0.654	0.751	0.735	0.707	0.720	0.658
AS3	**0.872**	0.737	0.628	0.717	0.724	0.693	0.723	0.624
AS4	**0.802**	0.747	0.641	0.637	0.766	0.649	0.618	0.648
AS5	**0.876**	0.801	0.695	0.726	0.785	0.723	0.704	0.700
EMP1	0.733	**0.834**	0.652	0.667	0.757	0.682	0.696	0.650
EMP2	0.766	**0.837**	0.673	0.656	0.808	0.687	0.641	0.686
EMP3	0.599	**0.736**	0.541	0.587	0.621	0.565	0.571	0.550
EMP4	0.750	**0.844**	0.612	0.649	0.721	0.656	0.627	0.615
EMP5	0.756	**0.843**	0.629	0.673	0.734	0.671	0.663	0.634
LOY1	0.690	0.698	**0.915**	0.653	0.707	0.746	0.631	0.759
LOY2	0.684	0.679	**0.920**	0.635	0.692	0.723	0.625	0.772
LOY3	0.720	0.725	**0.933**	0.690	0.738	0.745	0.656	0.860
REL1	0.646	0.624	0.564	**0.795**	0.634	0.606	0.656	0.558
REL2	0.706	0.665	0.605	**0.826**	0.668	0.638	0.667	0.610
REL3	0.650	0.632	0.578	**0.847**	0.644	0.610	0.661	0.587
REL4	0.653	0.640	0.590	**0.844**	0.669	0.616	0.663	0.599
REL5	0.754	0.718	0.636	**0.848**	0.705	0.682	0.697	0.639
RES1	0.804	0.824	0.700	0.721	**0.881**	0.748	0.700	0.697
RES2	0.743	0.770	0.654	0.635	**0.874**	0.687	0.636	0.655
RES3	0.690	0.709	0.628	0.709	**0.822**	0.666	0.655	0.634
RES4	0.788	0.786	0.695	0.739	**0.883**	0.767	0.709	0.698
RES5	0.744	0.780	0.679	0.665	**0.885**	0.729	0.663	0.680
SAT2	0.762	0.760	0.756	0.722	0.788	**0.965**	0.708	0.725
SAT3	0.784	0.782	0.791	0.745	0.814	**0.969**	0.727	0.762
TAN1	0.681	0.641	0.574	0.664	0.637	0.627	**0.816**	0.577
TAN2	0.558	0.529	0.457	0.501	0.523	0.511	**0.712**	0.450
TAN3	0.623	0.644	0.540	0.608	0.624	0.590	**0.815**	0.531
TAN4	0.651	0.636	0.577	0.693	0.639	0.614	**0.836**	0.575
TAN5	0.631	0.635	0.577	0.697	0.633	0.586	**0.772**	0.586
TRU1	0.707	0.712	0.838	0.678	0.715	0.721	0.641	**0.949**
TRU2	0.729	0.734	0.829	0.683	0.738	0.732	0.660	**0.956**
TRU3	0.729	0.729	0.787	0.683	0.745	0.731	0.657	**0.931**

Table 4

Hetrotrait-Monotrait (HTMT) Ratios

	AS	EMP	LOY	REL	RES	SAT	TAN
EMP	0.887						
LOY	0.833	0.847					
REL	0.824	0.892	0.793				
RES	0.852	0.889	0.842	0.882			
SAT	0.871	0.880	0.868	0.833	0.895		
TAN	0.897	0.803	0.782	0.920	0.874	0.832	
TRU	0.828	0.843	0.832	0.787	0.833	0.822	0.769

Structural Model

The assessment of the structural model in this study encompassed the concurrent evaluation of pathway coefficients (β) and coefficients of determination (R2), adhering to the methodology delineated by Hair et al. (2017). The application of the Partial Least Squares (PLS) method involved the use of 5000 subsamples to ascertain the significance level of path coefficients. The outcomes of hypothesis tests, encompassing confidence intervals, path coefficients (beta), associated t-statistics, and p-values, are detailed in Table 5. This thorough analysis yields valuable insights into the significance and robustness of the relationships among the variables within the structural model. *H1* focuses on the path from customer satisfaction (SAT) to loyalty (LOY). The decision column indicates that the hypothesized path (H1: SAT -> LOY) is supported, suggesting a statistically significant relationship between customer satisfaction and loyalty. The beta coefficient of 0.257 signifies the strength and direction of this relationship. The positive sign of the beta coefficient implies a positive association, indicating that an increase in customer satisfaction is associated with a corresponding increase in loyalty. The t-statistics value of 13.517 is notably high, further reinforcing the robustness of the relationship and suggesting that the observed relationship is not due to random chance. Additionally, the p-value of 0.000 is below the conventional significance threshold of 0.05, providing strong evidence to reject the null hypothesis and confirming the statistical significance of the path. H2 focuses on the path from service quality (SQ) to loyalty (LOY). The beta coefficient associated with H2: SQ -> LOY is 0.127, suggesting a positive relationship between service quality and loyalty. The t-statistics value of 6.605 is notably high, indicating the robustness of this relationship and suggesting that the observed effect is unlikely to be due to random chance. Furthermore, the p-value associated with this path is 0.000, which is below the conventional significance threshold of 0.05, providing strong evidence to reject the null hypothesis and confirming the statistical significance of the path from service quality to loyalty. This result supports the notion that higher levels of service quality are associated with increased loyalty. The primary decision criterion of 0.127, 6.605, and 0.000 confirms the overall support for the path from service quality to loyalty. H3 concentrates on the path from trust (TRU) to loyalty (LOY). The beta coefficient associated with H3: TRU -> LOY is notably substantial at 0.565, indicating a strong positive relationship between trust and loyalty. The exceptionally high t-statistics value of 31.277 attests to the robustness of this relationship, signifying that the observed effect is highly unlikely to be a result of random chance. Furthermore, the p-value of 0.000 is well below the conventional significance threshold of 0.05, providing compelling evidence to reject the null hypothesis and confirming the statistical significance of the path from trust to loyalty. This unequivocal result strongly supports the proposition that higher levels of trust significantly contribute to increased loyalty. The decision criterion of "Supported" underscores the clarity and strength of this relationship, emphasizing the pivotal role that trust plays in shaping customer loyalty. This finding carries substantial implications for businesses, highlighting the strategic importance of cultivating and maintaining trust with customers to foster long-term loyalty. In summary, the results from this analysis provide robust support for the hypothesized path (H3), reaffirming the critical link between trust and loyalty in the examined context.

The analysis conducted in the study provided substantial evidence to support all the of the hypotheses, confirming the relationships among the variables under investigation. A summary of the hypothesis testing results is presented in Table 5, including the effect size, which measures the magnitude of an effect independently of the sample size. Effect sizes in

this study were assessed using Cohen's criteria (1992) and categorized as small (0.020 to 0.150), medium (0.150 to 0.350), or large (0.350 or greater). The observed effect sizes ranged from small (0.018) to large (0.513). The intrinsic value inflation factor (VIF) values, displayed in Table 5, were all below the more lenient threshold of 5, with the highest value being 4.516. This level of collinearity allows for meaningful comparisons of sizes and interpretation of coefficients in the structural model. The revealed a significant degree of explained variance for the endogenous construct, with an R^2 value of 0.797 (Figure 2). The model's ability to make inferences and provide management suggestions was evaluated through out-of-sample predictive analysis using the PLSpredict method, as described by (Shmueli et al., 2016, 2019).

In Table 6, Q^2 predictions higher than 0 indicated that the predictions made by PLS-SEM outperformed the standard naive mean prediction results. Additionally, the root mean square error (RMSE) values of the PLS-SEM predictions were lower than those of the linear model (LM) prediction benchmark in all three instances, indicating the predictive power of the proposed model (Table 6). Hair et al (2022) introduced the Cross-Validated Predictive Ability Test (CVPAT) as a means to assess the predictive capabilities of Partial Least Squares Structural Equation Modeling (PLS-SEM) results. Liengaard et al (2021) subsequently applied the CVPAT alongside PLSpredicts analysis to evaluate the model's predictive performance. Using an out-of-sample prediction method, the CVPAT measured the model's prediction error and calculated the average loss value. To benchmark the results, two benchmarks were employed: the average loss value of predictions using indicator averages (IA) as a simple benchmark and the average loss value of a linear model (LM) forecast as a more conservative benchmark. For the model to demonstrate superior predictive capabilities, the average loss value of PLS-SEM should be lower than the benchmarks, resulting in a negative difference in the average loss values. The CVPAT aimed to assess whether the difference in average loss values between PLS-SEM and the benchmarks was significantly below zero, indicating enhanced predictive abilities. The results in Table 7 confirm that the average loss value of PLS-SEM was indeed lower than that of the benchmarks, supporting the model's superior predictive capabilities. In addition, Ringle and Sarstedt (2016); Hair et al (2018) recommended using Importance Performance Map Analysis (IPMA) to evaluate the significance and effectiveness of latent variables in explaining acceptance. The findings in Table 8 reveal the impact of various latent variables on loyalty. Trust exhibited the strongest influence on loyalty (0.565), followed by satisfaction (0.257) and service quality (0.127), indicating their relative importance in the loyalty context. In terms of performance scores, trust achieved the highest score (85.907), while satisfaction had the lowest score (82.043) on a scale from 0 to 100. Despite being the most critical factor for loyalty, satisfaction demonstrated the lowest performance level. Consequently, the recommendation for top management in Open and Distance Learning (ODL) higher education institutions is to prioritize activities aimed at improving students' satisfaction, as enhancing satisfaction is crucial for overall improvement in students' loyalty.

Table 5

Hypotheses Testing Results, f2 & Inner VIF

Path	Beta	T statistics	P values	f^2	Inner VIF	2.50%	97.50%	Decision
H1: SAT -> LOY	0.257	13.517	0.000	0.084	3.892	0.221	0.295	*Supported*
H2: SQ -> LOY	0.127	6.605	0.000	0.018	4.516	0.088	0.164	*Supported*
H3: TRU -> LOY	0.565	31.277	0.000	0.513	3.069	0.529	0.600	*Supported*

Table 6

PLS predict

	Q²predict	PLS-RMSE	LM_RMSE	PLS-LM
LOY1	0.639	0.471	0.477	-0.006
LOY2	0.638	0.493	0.496	-0.003
LOY3	0.753	0.338	0.342	-0.004

Table 7

Cross Predictive Ability Test (CVPAT)

	Average loss difference	t-value	p-value
AS	-0.403	36.698	0.000
EMP	-0.398	37.661	0.000
LOY	-0.406	29.663	0.000
REL	-0.342	33.527	0.000
RES	-0.410	36.762	0.000
TAN	-0.326	35.023	0.000
Overall	-0.379	39.905	0.000

Table 8

Importance-Performance Map Analysis (IPMA)

	Total Effect	Performance
SAT	0.257	82.043
SQ	0.127	82.671
TRU	0.565	85.907

Discussion

In light of the analyzed data results, enhancing students' satisfaction, service quality, and trust emerges as a pivotal strategy for fostering students' loyalty in online open distance learning higher education institutions (ODL HEIs). To effectively impact students' loyalty, institutions should consider a multifaceted approach that addresses each dimension individually while recognizing their interdependence. Strategies to enhance students' satisfaction should encompass personalized support mechanisms, responsive communication channels, and interactive learning experiences. Offering tailored assistance, acknowledging individual learning styles, and providing prompt feedback can significantly contribute to heightened satisfaction levels. Additionally, creating a user-friendly online interface, ensuring the availability of resources, and fostering a sense of community among online learners can enhance overall satisfaction. Improving service quality involves optimizing the technological infrastructure, refining course content, and ensuring the accessibility of learning resources.

Regularly updating and upgrading the online platform, employing advanced e-learning tools, and incorporating multimedia elements can elevate the quality of educational services. Additionally, instituting robust academic support services, such as virtual tutoring and counseling, contributes to a positive student experience and bolsters perceptions of service quality. Building students' trust in online learning environments involves transparency, reliability, and consistency. Institutions should communicate clearly about program expectations, accreditation status, and faculty qualifications. Consistent delivery of high-quality educational content, adherence to scheduled timelines, and maintaining integrity in assessment processes are crucial elements in establishing and reinforcing trust. Moreover, fostering a sense of belonging through online forums, virtual events, and collaborative projects can enhance students' trust in the institution. An integrated strategy that aligns these elements is key to achieving optimal results. For instance, a comprehensive student onboarding process that addresses individual needs provides robust academic support, and fosters a sense of community can simultaneously enhance satisfaction, service quality, and trust. Continuous monitoring and feedback mechanisms are essential to gauge the effectiveness of these strategies and make informed adjustments to meet evolving student expectations, ultimately promoting long-term loyalty in the dynamic landscape of online open-distance learning higher education institutions.

Theoretical Implications

The findings contribute to Service Quality (SERVQUAL) literature in online education, emphasizing the relevance of dimensions like reliability, responsiveness, assurance, empathy, and tangibles in shaping students' perceptions and fostering loyalty. Additionally, the study aligns with Relationship Marketing theories, highlighting the pivotal roles of trust and satisfaction in building enduring relationships and loyalty in online education. The Service-dominant Logic (SDL) perspective is also endorsed, emphasizing value co-creation through student interactions with online educational institutions. Enhancing service quality, trust, and satisfaction is identified as contributing to the co-created value in the online learning environment, impacting students' loyalty. The study's identified relationships resonate with the Expectancy-Confirmation Model (ECM), emphasizing reciprocal interactions, trust-building, and satisfaction as determinants of a positive exchange influencing students' loyalty in the unique context of ODL HEIs. These theoretical implications collectively contribute to a comprehensive understanding of the dynamics influencing students' loyalty in the online education landscape.

Practical Implications

Building trust emerges as a critical factor, suggesting institutions should focus on transparent communication, reliability in delivering promises, and creating a supportive online learning environment. Establishing mechanisms for faculty-student and student-institution interactions, addressing concerns promptly, and ensuring ethical practices contribute to trust-building. Enhancing students' satisfaction becomes a key driver for loyalty, implying that ODL HEIs should prioritize the improvement of teaching methods, content delivery, and overall learning experience. Regular feedback mechanisms, personalized support, and continuous adaptation to evolving educational needs are essential strategies. Institutions can develop targeted interventions based on identified pain points within the SERVQUAL dimensions. Technology upgrades, faculty development programs, and student support initiatives aligned with these factors can contribute to a positive and satisfying learning

environment. Fostering a sense of community and engagement in online learning platforms is crucial for building trust and satisfaction. Encouraging collaborative learning, providing networking opportunities, and creating a supportive virtual community positively influence students' perceptions and loyalty toward the institution. Overall, the practical implications provide strategic direction for ODL HEIs to optimize service quality, trust-building, and satisfaction, fostering student loyalty in the digital education landscape.

Suggestions for Future Study
Future studies should explore the longitudinal impact of emerging technologies on student satisfaction, trust, and loyalty in online open distance learning institutions. Investigating the role of personalized learning experiences, cultural influences, and evolving pedagogical strategies can provide valuable insights. Additionally, assessing the effectiveness of innovative support services, institutional communication strategies, and academic advising programs can shape recommendations for improving student satisfaction and trust. Exploring the link between academic achievements and loyalty, as well as the impact of alumni engagement activities, will contribute to a comprehensive understanding of the relationship in the context of online education. Continuous faculty development programs' role in enhancing service quality and building student trust is another promising avenue for future research.

Conclusion
This study illuminates the critical relationships between service quality, trust, and satisfaction with students' loyalty in online open distance learning higher education institutions. The theoretical grounding, supported by theory like expectancy confirmation, offers a robust foundation for understanding these dynamics. The findings emphasize the need for targeted strategies to enhance student satisfaction, trust, and service quality, particularly focusing on satisfaction improvement. Practical implications underscore the significance of fostering positive student experiences. Future studies should delve into emerging technological impacts and innovative support services. These insights are pivotal for educators and institutions striving to optimize the online learning environment and cultivate enduring student loyalty.

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