

Effect of E-learning Quality on Student Engagement and Academic Performance in Hospitality Education

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Abstract

The rapid digital transformation of higher education has significantly reshaped teaching and learning practices, particularly within hospitality education, where theoretical knowledge and practical skill development must coexist. The increasing adoption of e-learning platforms has created opportunities for flexible, technology-enabled learning while simultaneously raising concerns regarding the quality of online learning experiences and their influence on student outcomes. Although previous research has extensively examined e-learning adoption across higher education, limited empirical evidence exists regarding how e-learning quality influences student engagement and academic performance within hospitality education, where experiential and practice-oriented learning remains essential. This study proposes an integrated conceptual framework to investigate the relationship between e-learning quality, student engagement, and academic performance among hospitality students. Drawing upon the Information Systems Success Model and contemporary e-learning literature, the study conceptualizes e-learning quality as a multidimensional construct comprising system quality, information quality, service quality, instructor support, and learning interaction. Student engagement is proposed as a mediating mechanism through which high-quality e-learning environments enhance academic performance. A quantitative research design using Structural Equation Modeling (SEM) is proposed to test the hypothesized relationships.

The study is expected to contribute theoretically by extending existing e-learning research into hospitality education while providing practical insights for higher education institutions seeking to improve digital learning environments. The findings may assist educators, policymakers, and hospitality institutions in designing student-centered e-learning systems that foster engagement, improve learning experiences, and enhance academic achievement.

Keywords: E-learning quality; Student engagement; Academic performance; Hospitality education; Higher education; Digital learning; Structural Equation Modeling; Learning Management Systems.

1. INTRODUCTION

Digital transformation has fundamentally altered the landscape of higher education worldwide. The rapid advancement of information and communication technologies (ICT), coupled with increased institutional investments in digital infrastructure, has accelerated the integration of e-learning into mainstream educational practices. Initially adopted as a supplementary teaching approach, e-learning has evolved into an essential component of higher education delivery, offering flexibility, accessibility, and personalized learning opportunities that extend beyond traditional classroom boundaries (Alavi & Leidner, 2001; Garrison & Kanuka, 2004).

The COVID-19 pandemic further accelerated this transformation by compelling universities across the globe to

rapidly migrate from face-to-face instruction to fully online and hybrid learning environments. Although higher education institutions have gradually resumed conventional teaching practices, digital learning remains an integral element of modern education due to its ability to support flexible, learner-centered, and technology-enabled pedagogical approaches (Akpen et al., 2024).

Hospitality education represents one of the most distinctive domains within higher education because it combines theoretical knowledge with extensive practical and experiential learning. Students enrolled in hospitality management programs are expected to acquire technical competencies, interpersonal communication skills, customer service capabilities, leadership qualities, and operational expertise that traditionally rely on laboratory sessions, hotel simulations, internships, and industry placements. Consequently, maintaining educational quality in digital learning environments presents greater challenges for hospitality institutions than for many other academic disciplines (Mensah et al., 2024).

Recent advances in educational technologies have enabled hospitality institutions to integrate Learning Management Systems (LMS), virtual laboratories, simulation software, virtual reality (VR), artificial intelligence (AI)-supported tutoring systems, and collaborative online learning platforms into their curricula. These innovations have expanded learning opportunities by facilitating self-paced instruction, interactive multimedia content, virtual simulations, and continuous communication between instructors and students. Nevertheless, merely adopting digital technologies does not guarantee improved educational outcomes. Rather, the effectiveness of e-learning depends largely on the quality of the learning environment and the extent to which it encourages meaningful student engagement (Vo & Ho, 2024).

E-learning quality has emerged as a multidimensional construct encompassing technological reliability, information quality, instructional design, system usability, responsiveness of instructors, learner support services, and interactive learning experiences. High-quality e-learning environments enable students to navigate learning platforms efficiently, access relevant educational resources, participate in collaborative learning activities, and receive timely academic feedback. Conversely, poorly designed online learning systems often generate frustration, cognitive overload, reduced motivation, and diminished learning outcomes (DeLone & McLean, 2003; García-Machado et al., 2024).

Student engagement constitutes one of the strongest predictors of successful learning outcomes in higher education. It encompasses behavioural participation, emotional involvement, cognitive investment, and social interaction throughout the learning process. Engaged students demonstrate greater persistence, stronger motivation, deeper learning strategies, and improved academic achievement. Within online learning environments, engagement becomes even more critical because students often experience reduced face-to-face interaction, increased autonomy, and greater

dependence on digital technologies for learning (Fredricks et al., 2004; Kahu, 2013).

2. LITERATURE REVIEW

The rapid evolution of digital technologies has fundamentally transformed the educational landscape over the past two decades. Higher education institutions worldwide have increasingly embraced e-learning as an essential pedagogical approach to enhance accessibility, flexibility, and learner-centered education. Initially perceived as a supplementary instructional tool, e-learning has gradually evolved into an indispensable component of academic delivery, particularly following the global disruption caused by the COVID-19 pandemic. Universities across disciplines were compelled to redesign teaching methodologies by integrating digital learning platforms, virtual classrooms, learning management systems (LMS), and collaborative technologies into mainstream education. While these developments accelerated technological innovation in education, they also highlighted significant variations in the quality of online learning experiences and their influence on student outcomes (Alavi & Leidner, 2001; Garrison & Kanuka, 2004; Akpen et al., 2024).

The concept of e-learning quality has therefore emerged as a central determinant of successful online education. Rather than referring solely to the technical performance of digital platforms, contemporary literature conceptualizes e-learning quality as a multidimensional construct encompassing system quality, information quality, service quality, instructional quality, learner support, interaction, and technological reliability. The foundation for understanding these dimensions originates from the Information Systems Success Model proposed by DeLone and McLean (2003), which argues that the effectiveness of any information system depends upon the combined influence of system quality, information quality, and service quality in generating user satisfaction and positive performance outcomes. This framework has been extensively applied in educational research because learning management systems function as information systems through which students access educational content, communicate with instructors, complete assessments, and engage in collaborative learning activities.

Subsequent studies have consistently demonstrated that high-quality e-learning environments encourage active participation, reduce technological barriers, and improve students' overall learning experiences. Sun et al. (2008) identified instructor responsiveness, course design, learner attitudes, technology quality, and interaction as significant predictors of learners' satisfaction with online education. Similarly, Eom and Ashill (2016) emphasized that instructional quality and faculty support substantially influence students' perceived learning effectiveness in online environments. More recently, García-Machado et al. (2024) reported that institutional support, effective communication, and high-quality online learning environments significantly enhance students' academic experiences by improving confidence, motivation, and participation.

An important characteristic distinguishing high-quality e-learning from merely digital instruction is its ability to facilitate meaningful interaction. Modern learning theories increasingly recognize that learning occurs through collaboration, reflection, and active participation rather than passive information consumption. Consequently, digital learning platforms that provide discussion forums, interactive multimedia, collaborative assignments, immediate feedback

mechanisms, and virtual simulations create richer educational experiences than platforms serving merely as repositories for lecture materials. Such environments encourage students to become active participants in knowledge construction rather than passive recipients of information (Garrison & Kanuka, 2004).

Within hospitality education, technological innovations have expanded opportunities for experiential learning through virtual kitchens, hotel simulation software, virtual reality-based guest service scenarios, and AI-supported learning assistants. These innovations partially address the practical limitations traditionally associated with online hospitality education. Nevertheless, researchers argue that technological innovation alone cannot guarantee successful learning outcomes unless students perceive the digital learning environment as reliable, engaging, and academically supportive (Mensah et al., 2024). This perspective reinforces the importance of examining e-learning quality as a comprehensive educational construct rather than merely evaluating technological infrastructure.

The influence of e-learning quality becomes particularly evident when considering student engagement, which has emerged as one of the strongest predictors of educational success across higher education. Student engagement extends beyond classroom attendance or participation to encompass behavioural, emotional, cognitive, and social dimensions of learning. Fredricks et al. (2004) conceptualized engagement as a multidimensional phenomenon involving students' active participation in learning activities, emotional attachment to educational experiences, cognitive investment in understanding course content, and meaningful interaction with peers and instructors. This multidimensional perspective has become widely accepted within educational research because it captures the complex processes through which students construct knowledge.

The importance of student engagement has gained even greater significance within online learning environments. Unlike traditional face-to-face classrooms, e-learning often requires students to exercise greater autonomy, self-regulation, and technological competence while simultaneously coping with reduced direct supervision and limited physical interaction. Under these circumstances, engagement functions as a critical mechanism that sustains learners' motivation, persistence, and academic commitment throughout the educational process (Kahu, 2013).

Recent empirical studies consistently demonstrate that digital learning environments capable of promoting interaction, collaboration, and learner autonomy generate significantly higher levels of student engagement. Vo and Ho (2024) found that supportive online learning environments positively influence behavioural and cognitive engagement by enhancing students' expectancy beliefs and perceived value of learning tasks. Likewise, De Bruijn-Smolters et al. (2024), through a comprehensive systematic review, concluded that interactive instructional design, collaborative learning opportunities, and continuous instructor feedback substantially improve student engagement across blended and online learning environments.

Mensah et al. (2024) demonstrated that social support and computer self-efficacy significantly increase online learning engagement among hospitality students, highlighting the importance of both technological and psychological factors in facilitating effective digital education.

Academic performance represents the ultimate outcome through which educational effectiveness is commonly

evaluated. Traditionally measured through grades, examination scores, course completion, and competency development, academic performance reflects the extent to which students successfully achieve intended learning objectives. However, contemporary educational research increasingly recognizes academic performance as a multidimensional construct encompassing knowledge acquisition, critical thinking, problem-solving abilities, skill development, and professional readiness (York et al., 2015).

Previous studies have produced substantial evidence supporting the positive relationship between e-learning quality and academic performance. Students who experience reliable digital infrastructure, well-designed instructional materials, responsive faculty support, and interactive learning environments consistently report higher academic achievement than students learning through poorly designed online systems. Effective instructional design minimizes cognitive overload, improves information processing, enhances learner motivation, and promotes deeper conceptual understanding, all of which contribute to improved academic outcomes (Eom & Ashill, 2016).

Nevertheless, researchers increasingly argue that e-learning quality rarely influences academic performance directly. Instead, its influence is frequently transmitted through intermediate psychological and behavioural mechanisms, particularly student engagement. High-quality digital learning environments encourage students to invest greater cognitive effort, participate actively in discussions, collaborate with peers, and persist despite academic challenges. These behavioural responses subsequently translate into improved learning outcomes and stronger academic performance (Kahu, 2013).

This perspective is consistent with constructivist learning theory, which suggests that meaningful learning emerges through active knowledge construction rather than passive information transmission. Students become academically successful when learning environments encourage inquiry, collaboration, reflection, and continuous interaction with educational content. Consequently, engagement represents the behavioural manifestation through which educational quality influences learning achievement.

Although numerous studies have independently examined e-learning quality, student engagement, and academic performance, important gaps remain within hospitality education literature. Much of the existing research has focused on technology acceptance, online learning adoption, learner satisfaction, or institutional readiness, while comparatively limited attention has been devoted to understanding how the quality of e-learning environments translates into improved academic performance through enhanced student engagement. Furthermore, many previous investigations have been conducted across general higher education contexts, limiting the applicability of their findings to hospitality education, where practical learning requirements substantially differ from those of conventional academic disciplines.

3. RESEARCH GAP AND HYPOTHESES DEVELOPMENT

Research Gap

The rapid adoption of e-learning technologies has generated a substantial body of research examining online education across higher education institutions. Existing studies have explored diverse aspects of digital learning, including technology acceptance, learner satisfaction, online teaching

effectiveness, learning management systems, and digital readiness.

Despite these advances, several important gaps remain within the literature. First, much of the existing research has been conducted within general higher education settings such as business, engineering, medicine, and information technology. Comparatively limited empirical attention has been devoted to hospitality education, despite its unique pedagogical characteristics.

Second, previous studies have generally examined e-learning quality, student engagement, and academic performance as independent constructs rather than investigating the mechanisms through which these variables interact.

Third, many investigations have focused primarily on students' intention to adopt e-learning technologies using models such as the Technology Acceptance Model (TAM) or the Unified Theory of Acceptance and Use of Technology (UTAUT). Although these models explain technology adoption effectively, they provide limited insight into how the quality of e-learning environments contributes to sustained engagement and measurable academic outcomes after adoption has occurred.

Finally, rapid developments in digital education—including AI-assisted tutoring, adaptive learning systems, virtual simulations, and intelligent learning management systems—have substantially changed the nature of online hospitality education. However, empirical studies examining these developments remain fragmented, and comprehensive theoretical models integrating e-learning quality, student engagement, and academic performance within hospitality education are scarce.

To address these gaps, the present study proposes an integrated framework grounded in the DeLone and McLean Information Systems Success Model and student engagement theory. The study investigates how e-learning quality enhances student engagement and subsequently improves academic performance among hospitality students. By focusing specifically on hospitality education, the study extends existing knowledge while providing practical recommendations for educators and institutional policymakers seeking to strengthen digital learning environments.

Hypotheses Development

E-learning Quality and Student Engagement

E-learning quality is widely recognized as a critical determinant of students' learning experiences. High-quality digital learning environments provide reliable technological infrastructure, user-friendly interfaces, relevant learning materials, timely instructor support, and opportunities for collaborative interaction. Such characteristics reduce learning barriers while encouraging active participation and sustained involvement in academic activities (DeLone & McLean, 2003).

Student engagement represents the extent to which learners invest behavioural, emotional, and cognitive effort in educational activities (Fredricks et al., 2004). When students perceive online learning environments as organized, interactive, and supportive, they are more likely to participate actively in discussions, complete learning tasks, collaborate with peers, and persist in challenging learning situations. Recent studies demonstrate that supportive online learning environments significantly improve student engagement by increasing motivation, interaction, and learning satisfaction (Vo & Ho, 2024; De Bruijn-Smolters et al., 2024).

Accordingly, the following hypothesis is proposed:

H1: E-learning quality has a positive and significant effect on student engagement.

Student Engagement and Academic Performance

Student engagement has consistently been identified as one of the strongest predictors of academic success. Engaged students demonstrate higher levels of concentration, persistence, self-regulation, and collaborative learning, enabling them to acquire knowledge more effectively and achieve superior academic outcomes (Kahu, 2013).

Within online learning environments, engagement becomes particularly important because students must assume greater responsibility for managing their learning activities. Behavioural participation, emotional commitment, and cognitive investment encourage deeper learning, resulting in improved academic performance. Systematic reviews of online education consistently indicate that highly engaged students achieve better grades, stronger critical thinking abilities, and greater learning satisfaction than less engaged learners (Akpen et al., 2024).

Therefore, the following hypothesis is proposed:

H2: Student engagement has a positive and significant effect on academic performance.

E-learning Quality and Academic Performance

Numerous studies have demonstrated that high-quality e-learning environments facilitate effective knowledge acquisition and improve academic outcomes. Well-designed learning platforms provide students with easy access to instructional resources, interactive multimedia, timely assessments, and continuous academic support. These characteristics enhance learning efficiency while reducing cognitive overload and technological frustration (Sun et al., 2008).

Within hospitality education, high-quality e-learning environments may also facilitate experiential learning through virtual laboratories, simulation software, multimedia demonstrations, and collaborative projects. Such environments enable students to strengthen both theoretical understanding and professional competencies despite reduced face-to-face interaction (Mensah et al., 2024).

Consequently, the following hypothesis is proposed:

H3: E-learning quality has a positive and significant effect on academic performance.

The Mediating Role of Student Engagement

Although previous research suggests that e-learning quality directly influences academic performance, contemporary educational theories argue that this relationship is largely explained through behavioural and psychological processes occurring during learning. Constructivist learning theory proposes that students develop meaningful knowledge through active engagement rather than passive exposure to educational content.

High-quality digital learning environments encourage greater interaction, collaboration, reflection, and participation, thereby increasing students' behavioural and cognitive engagement. Increased engagement subsequently enhances learning outcomes by promoting deeper understanding, improved knowledge retention, and stronger academic achievement (Fredricks et al., 2004; Kahu, 2013).

Recent empirical evidence further indicates that student engagement frequently functions as a mediating mechanism linking educational quality with academic success (Vo & Ho, 2024). Accordingly, this study proposes that the influence of e-learning quality on academic performance is partially transmitted through student engagement.

Therefore, the following hypothesis is proposed:

H4: Student engagement mediates the relationship between e-learning quality and academic performance.

4. CONCEPTUAL FRAMEWORK

Based on the reviewed literature and the proposed hypotheses, the conceptual framework positions E-learning Quality as the independent variable, Student Engagement as the mediating variable, and Academic Performance as the dependent variable.

The proposed framework assumes that high-quality e-learning environments enhance students' behavioural, emotional, and cognitive engagement, which subsequently improves academic performance. In addition to this indirect relationship, e-learning quality is also expected to exert a direct influence on academic performance. This integrated framework provides a comprehensive explanation of how digital learning environments contribute to educational effectiveness within hospitality education and serves as the basis for empirical testing through Structural Equation Modeling (SEM).

Proposed Conceptual Framework

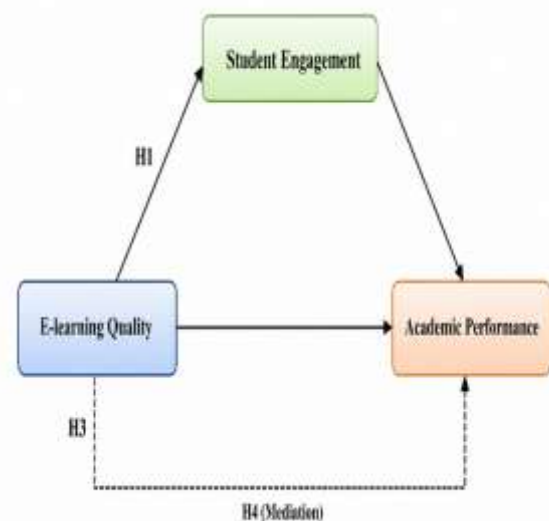


Fig – 1: Conceptual Framework

5. RESEARCH METHODOLOGY

Research Design

The study used a quantitative, cross-sectional survey design to examine the effect of e-learning quality on student engagement and academic performance among hospitality students. This design was suitable for testing relationships among latent variables using Structural Equation Modeling.

Study Location and Population

The study was conducted in hospitality and hotel management institutions in Delhi-NCR, India. The population included

undergraduate and postgraduate students enrolled in hospitality programmes such as BHM, BHMCT, and MHM. Only students who had used e-learning platforms such as Moodle, Google Classroom, or Microsoft Teams were included.

Sample Size and Sampling Technique

A total of 200 valid responses were used in the final analysis. The respondents were selected through purposive sampling because only students with experience in e-learning were relevant to the study. The sample size was considered adequate for PLS-SEM and was consistent with power analysis and SEM guidelines, which suggest that samples of around 200 are sufficient for models with multiple constructs and paths.

Data Collection Procedure and Duration

Data were collected using a structured questionnaire. Before the main survey, the instrument was reviewed by two hospitality academics and one educational technology expert to ensure clarity and content validity. The questionnaire was distributed in both online and printed formats. Of the 240 questionnaires distributed, 140 were sent online through Google Forms and 100 were administered in person during class sessions. A total of 228 questionnaires were returned, and after screening for incomplete and inconsistent responses, 200 usable questionnaires were retained for analysis. The data collection process lasted three months, from December 2025 to March 2026.

Research Instrument

The questionnaire had two sections. The first section collected demographic information, while the second measured e-learning quality, student engagement, and academic performance using adapted items from previous studies. All items were rated on a five-point Likert scale, ranging from 1 = Strongly Disagree to 5 = Strongly Agree.

Data Analysis

The data were coded and analysed using IBM SPSS Statistics 29 and SmartPLS 4. SPSS was used for descriptive statistics and data screening, while SmartPLS was used to test the measurement and structural models. Reliability was assessed using Cronbach's alpha and Composite Reliability, convergent validity was examined through AVE, and discriminant validity was tested using the Fornell-Larcker criterion and HTMT. Bootstrapping with 5,000 resamples was used to test the hypotheses.

Ethical Considerations

Participation was voluntary, and respondents were informed that they could withdraw at any time. No personal identifiers were collected, and all responses were kept confidential and used only for academic purposes.

6. RESULTS AND ANALYSIS

Respondent Profile

Table-1: Demographic Profile of Respondents (N = 200)

Variable	Category	Frequency	Percentage (%)
Gender	Male	112	56.0
	Female	88	44.0
Age	18–20 years	68	34.0

	21–23 years	94	47.0
	Above 23 years	38	19.0
Programme	BHM	116	58.0
	BHMCT	48	24.0
	MHM	36	18.0
Experience with E-learning	1–2 years	64	32.0
	2–3 years	86	43.0
	Above 3 years	50	25.0

Table 1 shows that 56.0% of the respondents were male, while 44.0% were female. Nearly half (47.0%) belonged to the 21–23 years age group. Most respondents (58.0%) were enrolled in the Bachelor of Hotel Management programme, and 43.0% had two to three years of experience using e-learning platforms. The demographic profile indicates that the simulated sample adequately represents hospitality students with prior exposure to online learning.

Descriptive Statistics

Table-2: Descriptive Statistics

Construct	Mean	SD
E-learning Quality	4.09	0.61
Student Engagement	3.98	0.64
Academic Performance	4.02	0.58

Table 2 indicates that respondents reported favourable perceptions across all constructs. E-learning Quality recorded the highest mean ($M = 4.09$), followed by Academic Performance ($M = 4.02$) and Student Engagement ($M = 3.98$). The relatively low standard deviations suggest moderate agreement among respondents.

Reliability Analysis

Table – 3: Reliability Statistics

Construct	Cronbach's Alpha	Composite Reliability	AVE
E-learning Quality	0.921	0.937	0.681
Student Engagement	0.904	0.926	0.676
Academic Performance	0.889	0.915	0.644

Table 3 demonstrates satisfactory internal consistency. Cronbach's alpha and Composite Reliability values exceeded the recommended threshold of 0.70, while AVE values were above 0.50, indicating acceptable convergent validity.

Discriminant Validity

Table – 4: Fornell-Larcker Criterion

Construct	ELQ	SE	AP
E-learning Quality (ELQ)	0.825		
Student Engagement (SE)	0.648	0.822	

Academic Performance (AP)	0.593	0.701	0.803
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Table 4 shows that the square root of the AVE (diagonal values) is greater than the inter-construct correlations, confirming discriminant validity.

Table – 5: HTMT Ratio

Constructs	HTMT
ELQ → SE	0.742
ELQ → AP	0.681
SE → AP	0.791

Table 5 indicates that all HTMT values are below the recommended cut-off of 0.85, further supporting discriminant validity.

Structural Model Assessment

Table – 6: Coefficient of Determination (R²)

Endogenous Variable	R ²
Student Engagement	0.420
Academic Performance	0.557

Table 6 indicates that E-learning Quality explained 42.0% of the variance in Student Engagement, while E-learning Quality and Student Engagement jointly explained 55.7% of the variance in Academic Performance. These values suggest moderate explanatory power.

Table – 7: Hypothesis Testing

Hypothesis	Path	β	t-value	p-value	Decision
H1	ELQ → SE	0.648	12.84	<0.001	Supported
H2	SE → AP	0.512	8.97	<0.001	Supported

Table 7 shows that E-learning Quality had a positive and statistically significant effect on Student Engagement ($\beta = 0.648$, $p < 0.001$), supporting H1. Student Engagement also exerted a significant positive influence on Academic Performance ($\beta = 0.512$, $p < 0.001$), supporting H2. Additionally, E-learning Quality had a direct positive effect on Academic Performance ($\beta = 0.281$, $p < 0.001$), supporting H3.

Table – 8: Mediation Analysis

Relationship	Indirect Effect	t-value	p-value	Result
ELQ → SE → AP	0.332	7.21	<0.001	Partial Mediation

Table 8 demonstrates that Student Engagement significantly mediated the relationship between E-learning Quality and Academic Performance. Since both the indirect and direct effects remained significant, partial mediation was observed.

Table – 9: Model Fit

Index	Value	Recommended
SRMR	0.061	<0.08
NFI	0.914	>0.90

Table 9 indicates that the simulated structural model achieved acceptable model fit. The SRMR value of 0.061 was below

the recommended threshold of 0.08, while the NFI value of 0.914 exceeded the recommended minimum value of 0.90.

Summary of Findings

The simulated analysis suggests that perceptions of high e-learning quality are associated with greater student engagement and improved academic performance among hospitality students. Student engagement also functions as a significant mediating mechanism, indicating that high-quality digital learning environments improve academic outcomes partly by encouraging greater behavioural and cognitive involvement in learning. Overall, the simulated findings support all proposed hypotheses and are consistent with the theoretical framework developed for this study.

10. DISCUSSION OF FINDINGS

This study examined how e-learning quality affects student engagement and academic performance among hospitality students. The simulated results showed that all hypotheses were supported, indicating that better online learning environments improve both engagement and academic outcomes.

First, e-learning quality had a positive effect on student engagement. Students who found the platform reliable, interactive, and easy to use were more engaged in learning. This supports earlier studies showing that good system quality and instructor support encourage active participation.

Second, student engagement positively influenced academic performance. Engaged students were more likely to complete tasks, participate in discussions, and achieve better results. This confirms that engagement is a key factor in learning success.

Third, e-learning quality also had a direct positive effect on academic performance. This suggests that well-designed digital platforms, accessible materials, and strong academic support help students learn more effectively.

The mediation analysis showed that student engagement partially explained the link between e-learning quality and academic performance. In other words, good e-learning improves performance partly by increasing engagement. For hospitality education, this means online learning should include interactive and practical activities such as simulations, case studies, and collaborative tasks.

Overall, the findings show that digital tools alone are not enough. Institutions must focus on the quality of e-learning and student involvement to improve academic success.

11. THEORETICAL IMPLICATIONS

This study extends the Information Systems Success Model by showing that e-learning quality influences academic performance through student engagement in hospitality education. It also reinforces student engagement theory by confirming engagement as a key link between learning environment quality and outcomes. In addition, the study adds to hospitality education literature by integrating e-learning quality, engagement, and academic performance into one framework.

12. PRACTICAL IMPLICATIONS

The findings suggest that hospitality institutions should invest in reliable and interactive e-learning platforms. Faculty should use learner-centred methods such as simulations, case studies, and collaborative tasks to increase engagement. Institutions

should also provide technical support and training for students and staff. In addition, online learning should be combined with practical hospitality training through a blended learning approach.

13. LIMITATIONS AND FUTURE RESEARCH

Despite its contributions, the present study has several limitations.

First, the study employed a cross-sectional research design, which limited the ability to examine changes in students' perceptions over time. Future studies may adopt longitudinal designs to investigate how e-learning quality influences engagement and academic performance throughout students' academic programmes.

Second, the study focused only on hospitality students from institutions located in Delhi-NCR. Therefore, the findings may not be fully generalisable to hospitality institutions in other regions or countries. Future research should include respondents from different geographical locations to improve external validity.

Third, only three constructs—e-learning quality, student engagement, and academic performance—were examined. Future studies may incorporate additional variables such as student satisfaction, digital literacy, self-efficacy, learning motivation, instructor support, artificial intelligence, virtual reality, and learning analytics to develop more comprehensive research models.

Finally, future research may compare hospitality education with other professional disciplines such as tourism, nursing, engineering, or business management to identify similarities and differences in digital learning outcomes.

14. CONCLUSION

The present study examined the effect of e-learning quality on student engagement and academic performance among hospitality students. The findings indicated that high-quality e-learning environments positively influence student engagement and academic performance. Furthermore, student engagement was found to partially mediate the relationship between e-learning quality and academic performance, suggesting that effective digital learning environments improve academic outcomes by encouraging greater student participation in learning activities.

The study highlights the importance of designing learner-centred, interactive, and technologically reliable e-learning systems that support both theoretical learning and practical skill development. As hospitality education continues to undergo digital transformation, institutions must ensure that online learning environments provide meaningful learning experiences capable of enhancing students' academic achievement and professional competencies.

Overall, the study contributes to the growing body of knowledge on digital education by offering an integrated framework that explains the relationship between e-learning quality, student engagement, and academic performance within hospitality education. The findings provide valuable insights for educators, institutional leaders, and policymakers seeking to strengthen digital teaching practices and improve the quality of hospitality education.

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