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The Impact of Institutional Preparedness And Students' E-Learning Satisfaction During Online Education: Mediating Impact of Course Design Quality

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Abstract

Educational institutional preparedness with course design quality is a vital component in determining student's e-learning satisfaction. Understanding the adoption of online education and the impact of e-learning satisfaction helps educators take necessary actions to enhance online education prerequisites. Data were collected from a sample of 186 nursing students at Khyber Medical University through a structured questionnaire. A quantitative research approach was utilized, with Structural Equation Modeling (SEM) conducted in AMOS software to test the hypothesized relationships. The results indicate that institutional preparedness significantly affects e-learning satisfaction, with course

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design quality playing a partial mediating role. The findings emphasize the critical role of institutional readiness and high-quality course design in fostering positive e-learning experiences for nursing students. This research offers valuable insights for academic institutions aiming to enhance their online education frameworks and improve student satisfaction in healthcare-related disciplines.

Keywords: Institutional preparedness, e-learning satisfaction, course design quality, nursing education, structural equation modeling.

Introduction

The recent COVID-19 pandemic has impacted higher education institutions around the world. Many countries enacted a nationwide lockdown, prohibiting much of students' face-to-face connection and physical presence in higher education institutions. Higher education continues to struggle with the epidemic, which began in December 2019 (Hornsby, Kuratko, & Zahra, 2002). Higher education institutions responded to the sudden change to distant and online learning by adjusting to enable the provision of flawless and sustainable teaching and learning online. (Masadeh et al., 2023).

Higher education institutions rely on course content quality, teaching, and learning environment, in exclusively expanded online education. (Sofi-Karim, Bali, & Rached, 2023). However, prior literature (e.g. (Bou-Hamad & El Danaoui, 2024) Indicates educational institutional preparedness in delivering e-learning effectively, in the recent age of online education. For efficient online education delivery, institutional preparedness and course design are pivotal factors that influence students' e-learning satisfaction. Educational Institutional preparedness encompasses the readiness of higher education institutions to provide the necessary technological infrastructure, faculty training, and administrative support required for seamless online education. Most recent studies (Alnemrat, Aldamen, Al-Deaibes, & Alsharefeen, 2023) Found a significant role in learning management systems that are functional, accessible, and user-friendly. Therefore, a sudden shift

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to online platforms caused a significant diverse influence on school students, including an increase in depression and anxiety disorders.

In this evolving context, understanding the determinants of students' e-learning satisfaction becomes critical. Students' e-learning satisfaction with educational institutional preparedness incurs immediate results of a successful learning experience as well as their overall performance using e-learning systems (Nabayra & Tambong, 2023). From an online perspective, student e-learning satisfaction is predictable as a vital indicator of higher education online education (Moussa, 2023). Usually, satisfaction describes students' subjective evaluation of their results and the whole educational process. Higher education institutions have researched student views and satisfaction with academic education (Arsenijević, Belousova, & Tushnova, 2023). Student satisfaction indicators have acquired prominence because mostly related to institutional rankings and performance. Likewise, course design is a novel research area that remains unexplored despite its potential to provide insights into student satisfaction. The current research on e-learning satisfaction has notable limitations, despite its significance. Numerous studies concentrate on specific elements, such as technology adoption or instructional strategies, while neglecting to analyze the synergistic effects of institutional preparedness and course design on e-learning satisfaction.

Furthermore, a significant portion of the research is confined to developed nations, overlooking the specific challenges faced by developing countries in e-learning, including digital inequality, resource scarcity, and low levels of digital literacy. The applicability of findings from developed nations to other contexts is, therefore, uncertain. Furthermore, studies often adopt a qualitative nature, relying heavily on thematic analysis, which may introduce bias (Sharif Nia et al., 2023). This creates a significant gap in the literature, necessitating comprehensive investigations that explore the dynamics of e-learning satisfaction in

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underexplored regions and integrate multiple dimensions, including institutional preparedness and course design on students' e-learning satisfaction. Hence, the current research seeks to address the following questions. How does institutional preparedness influence students' e-learning satisfaction? Does course design interact mediating role to enhance e-learning satisfaction?

This study contributes significantly to the understanding of educational institutional preparedness and e-learning satisfaction. This study addresses a research gap by examining the combined effects of institutional preparedness and course design, aspects frequently neglected in prior research. Furthermore, it emphasizes the significance of institutional preparedness, encompassing technological infrastructure and accessible learning management systems, in improving e-learning experiences. Third, it presents course design as a mediator, highlighting its significance in enhancing student satisfaction. The study examines challenges unique to developing nations, including digital inequality and resource scarcity, thereby enhancing the relevance of its findings. These contributions establish a thorough framework for subsequent research endeavors.

Literature Review

Educational Institutional Preparedness

Educational institutional Preparedness refers to the capability of educational institutions to effectively anticipate, respond to, and adapt to diverse challenges, whether they stem from natural disasters, pandemics, technological advancements, or socio-political changes. This readiness includes infrastructural robustness, the integration of digital learning tools, policies for equitable education access, teacher and staff capacity building, and adaptive curriculum strategies designed to sustain learning outcomes under varying circumstances. (Mehmood, 2016).

Course Design Quality

The quality of course design pertains to the components of the course, including course information, instructional objectives, course layout, and course outcomes.

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Effective course design necessitates meticulous planning, the incorporation of pedagogical best practices, and the alignment of content, assessments, and instructional methods. The quality of course design is essential for achieving learning objectives, engaging students, and promoting successful learning outcomes. The quality of course design involves the development of a structured and effective learning environment that facilitates meaningful engagement with content, achievement of course objectives, and adequate preparation for assessments. (Chugh, Upadhyay, & Chugh, 2023).

E-Learning Satisfaction

E-learning satisfaction refers to the level of contentment and fulfillment experienced by learners when engaging in online educational activities (Dziewanowska & Kacprzak, 2023). This can be influenced by various factors such as the quality of the course material, the effectiveness of the learning platform, and the support provided by instructors. In this paragraph, we will explore the key components that contribute to e-learning satisfaction and discuss the importance of meeting learners' needs and expectations in order to enhance their overall learning experience. One important component of e-learning satisfaction is the usability of the online platform. Learners should be able to easily navigate through the course material, access resources, and interact with instructors and fellow students. Additionally, personalized feedback and support from instructors can greatly impact a learner's satisfaction with the online learning experience. By continuously evaluating and improving these key components, educational institutions can ensure that learners feel supported and engaged, ultimately leading to higher levels of satisfaction and success in their online courses.

Hypothesis Development

Educational Institutional Preparedness and E-learning Satisfaction

Institutional preparedness plays a crucial role in determining a learner's satisfaction and enhancing the online learning experience. (Bou-Hamad & El

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Danaoui, 2024) Stated that institutional preparedness of e-learning impacts learners' satisfaction levels higher. It has also been found that preparedness forces extra money into e-learning programs and higher rates of learner satisfaction. Preparedness should include well-structured courses, access to high-quality digital resources, adequate instructor training, and learner support systems. Therefore, it is crucial for educational institutions to continuously evaluate and improve their e-learning platforms to see evolving needs and learners' expectations. (Oyetade, Harmse, & Zuva, 2023) Argues that with advancements in technology and continuously seeking feedback from learners, institutions could ensure that online learning platforms remain effective and user-friendly. Ultimately, e-learning programs investing not only benefit learners but also contribute to overall success and educational institutions' reputation in the modern era. Overall, integrating e-learning into traditional education models can enhance the overall learning experience and better prepare students for success in the increasingly digital world. Therefore, investing in e-learning educational institutional preparedness programs is not just a trend, but a necessary step for educational institutions to remain innovative and meet students' evolving needs and e-learning satisfaction. Therefore, proposed that:

H1: Institutional Preparedness has a Positive Impact on E-Learning Satisfaction

Educational Institutional Preparedness and Course design Quality

Within higher education contexts, the concept of quality is multifaceted and intricate. Effective content design includes engaging materials, relevant, and well-organized, often incorporating multimedia elements like videos, quizzes, and animations for interactivity and engagement enhancement (Al-Maskari, Al Riyami, & Ghnimi, 2022). Therefore, the monitoring of quality should be entered around enhancing and advancing student learning environment. Furthermore, faculty professional development and educational preparedness are essential in helping and adapting to new course designs. Also, regular course design quality

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enhancement can help educational institutions maintain engaging and interactive courses. Preparedness includes structured feedback collection mechanisms, permitting iterative enhancements in course design grounded on student and faculty inputs. (Oyetade et al., 2023) argues that well-prepared institutions could swiftly adapt new course designs to address changes in technological advancements or external academic standards. Embracing e-learning could also help institutions reach a wider audience and stay competitive in a rapidly evolving educational landscape. By investing in e-learning platform development and supporting faculty in adapting their teaching methods, institutions could ensure that they are prepared for future education. Therefore, we proposed that:

H2: Institutional Preparedness has a Positive Impact on Course design Quality

Institutional Preparedness, Course Design Quality, E-Learning Satisfaction

In the e-learning context, more necessary for learners' motivation can be what to deliver than how to deliver it. Likewise, Institutional preparedness is also crucial for increasing e-learning satisfaction by ensuring that the required resources, infrastructure, and support mechanisms are in place. Studies have shown that institutions that are well-prepared, including technological infrastructure and administrative assistance, have a major impact on students' favorable e-learning experiences. Furthermore, institutional preparation is highly related to the quality of course design. When universities invest in resources like advanced e-learning platforms, faculty training, and instructional materials, might create high-quality courses that satisfy the needs and preferences of students. (Maheshwari, 2021). In turn, the quality of course design has a direct impact on e-learning satisfaction, since engaging, dynamic, and well-structured courses provide students with a more gratifying learning experience. (Elumalai et al., 2021). Furthermore, the mediating role of course design quality emphasizes the need to convert institutional preparation into increased satisfaction levels. When institutions are well-prepared, the quality of course design serves as a conduit, ensuring that the

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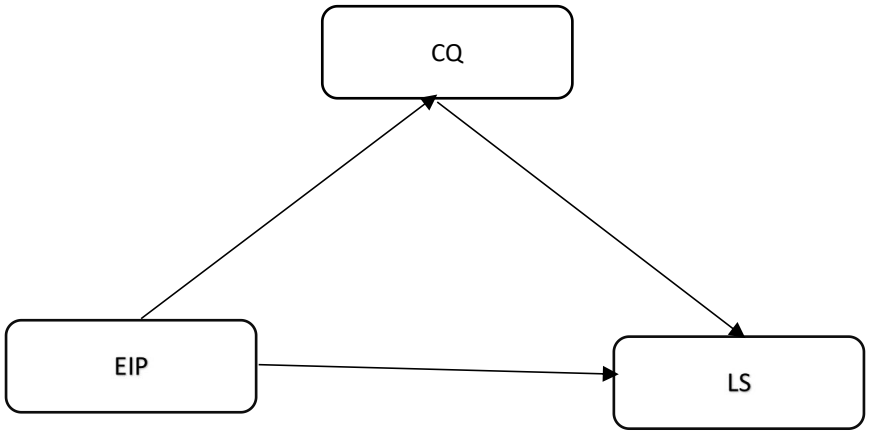
positive benefits of institutional resources are reflected in learner satisfaction (Chiu et al., 2022). Thus, this study posits that course design quality could mediating influence on e-learning satisfaction and educational institutional Preparedness success. Hence, this study hypothesizes.

H3: Course Design Quality is the Mediating Impact between Institutional Preparedness and E-Learning Satisfaction



Methodology

The sample for this study comprised nursing BS-level nursing students from Khyber Medical University, Peshawar. The study utilized a structured online questionnaire divided into two sections to evaluate the proposed theoretical framework. The first section was designed to collect demographic details of the respondents, while the second section focused on gathering data related to the key constructs of the study. These constructs were measured using a 5-point Likert scale, where participants expressed their agreement or disagreement with each statement, with (1) representing "strongly disagree" and (5) representing "strongly agree." The survey was conducted online. The survey was shared with 400 students via mailing lists, direct contact, and professional social media platforms. In total, 186 usable surveys were obtained, representing a response rate of 46.5%. The respondents were informed that their participation in this study was voluntary, and the data process was anonymous.

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Measurement Scale

Educational Institutional Preparedness

(Hornsby, Kuratko, Holt, & Wales, 2013) refined the 18-item EIP scale from earlier work by (Hornsby et al., 2002). EIP scale measurement items include (1) work discretion, (2) time availability, (3) management support, and (4) rewards and reinforcements. Scale items include My supervisor allows me to make decisions without consulting them, and I have adequate time to develop new ideas during my work schedule.

Course design Quality

CD 4 items scale was adopted from the earlier work by (Almaiah & Alyoussef, 2019; Wright, 2003) Research. Scale items include (1) Content Quality (2) Engagement (3) Assessment Evaluation (4) Usability. Scale items include, '"Learning objectives are clear and measurable." and "The course interface is user-friendly and consistent.

E-Learning Satisfaction

The E-learning satisfaction 5 items scale was adopted through research of (Gavrılıs, Mavroıdıs, & Gıossos, 2020). Scale items include I was very satisfied with this course and 'I feel that this course served my needs well'.

Analytical Techniques

To validate the questionnaire and test the structural model, the study employed Analysis of Moment Structures (AMOS) with data collected from 333 participants representing 119 manufacturing and service firms. Data analysis utilized SPSS and AMOS version 23. SEM was deemed suitable based on prior research, as it effectively represents and analyzes complex regression relationships within a single framework (Hair Jr, Howard, & Nitzl, 2020). Moreover, SEM has been recognized as a robust method for investigating mediation and interaction effects. (Masadeh et al., 2023). Consequently, this study utilized the SEM approach with maximum likelihood estimation to evaluate the proposed hypotheses. Moreover,

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With the Bootstrap test, the mediating role of course design quality between EIP and LS was check. The result is considered significant and a parallel mediating relationship exists if the boot ULCI (upper limit confidence interval) and the boot LLCI (lower limit confidence interval) both exclude the value 0. Otherwise, a full mediating relationship exists.

Results

Descriptive Statistics

Table 1 presents the means, standard deviations, skewness, and kurtosis for the study variables: Institutional Preparedness and Course Design on Students' E-Learning Satisfaction. The results indicate that all variables are approximately normally distributed, with skewness and kurtosis values within the acceptable range of ±2 (Matore & Khairani, 2020).

Variable	Mean	S.D	Skewness	Kurtosis
Educational Institutional Preparedness	3.12	1.24	-0.51	-0.33
Course design Quality	3.01	1.11	-0.47	-0.28
E-Learning Satisfaction	3.05	1.14	-0.60	-0.22

Table 1 shows descriptive statistics for the variables—Educational Institutional Preparedness, Course Design Quality, and E-Learning Satisfaction—which offer important insights into respondents' perceptions. The mean values, between 3.01 and 3.12, suggest a moderate level of agreement or satisfaction, with institutional preparedness achieving a slightly higher score of 3.12. This indicates that institutions are viewed as somewhat equipped for e-learning. The average perceptions of course design quality (mean = 3.01) and e-learning satisfaction (mean = 3.05) suggest potential for enhancement in these domains. The standard deviations, ranging from 1.11 to 1.24, indicate moderate response variability, with institutional preparedness demonstrating the highest diversity of perceptions among the three variables. The skewness values for all variables are negative,

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ranging from -0.47 to -0.60, which indicates a slight leftward skew in the distributions. This indicates that responses tend to cluster around higher values, demonstrating a slight positive bias in perceptions. Kurtosis values are close to zero, ranging from -0.33 to -0.22, indicating that the distributions are nearly normal, exhibiting neither extreme tails nor flat peaks. The data indicates a moderately positive perception of the e-learning environment, characterized by consistent responses and a slight tendency towards higher ratings. The findings indicate a necessity for enhancements in institutional preparedness, course design quality, and overall e-learning satisfaction to improve the e-learning experience.

Measurement Model Evaluation

Measurement Model

A Confirmatory Factor Analysis (CFA) was conducted using AMOS to ensure the validity and reliability of the measurement scales. Table 2 reports key fit indices.

Table 2: Model Fit Indices

Fit Index	Threshold	Observed Value
Chi-square (χ^2/df)	< 3.0	2.66
RMSEA	< 0.08	0.072
CFI	> 0.90	0.94
TLI	> 0.90	0.92
SRMR	< 0.08	0.044

The fit indices indicate an excellent model fit, meeting all established thresholds. The Chi-square value (χ^2/df = 2.66) is below the threshold of 3.0, signifying minimal discrepancies between observed and predicted data. The RMSEA (0.072) and SRMR (0.044) values are well within acceptable limits (< 0.08), confirming low approximation error and residual discrepancies. Furthermore, the CFI (0.94) and TLI (0.92) exceed a threshold of 0.90, demonstrating a strong comparative and

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parsimonious fit. These results collectively validate measurement model reliability and robustness, supporting its use for hypothesis testing.

Validity Assessment

Next, validity assessment is carried out considering the evaluation of convergent, divergent, and discriminant validity. The convergent validity for the measurement model was achieved when all AVE values exceeded 0.50, whereas the composite reliability was achieved when all CR values exceeded 0.60 (Hair Jr et al., 2020). As shown in Table 2 all factor loadings were more than 0.6. The dataset satisfied the validity of the sample. Cronbach's alpha is calculated for each factor to assess construct reliability, and each variable's value is within the best level of reliability (> 0.900). Discriminant validity is achieved as displayed in Table 3—no concerns related to scale reliability and divergent convergent validity.

Table 2 Convergent and Divergent Validity Assessment

Construct		items	Loadings	AVE	CR	Cronbach Alpha
Educational Preparedness	Institutional	EIP1	0.834	0.715	0.9	0.867
		EIP2	0.82			
		EIP3	0.79			
		EIP4	0.85			
		EIP5	0.81			
		EIP6	0.815			
		EIP7	0.825			
		EIP8	0.845			
		EIP9	0.83			
		EIP10	0.84			
		EIP11	0.835			
		EIP12	0.845			

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	EIP13	0.828			
	EIP14	0.81			
	EIP15	0.815			
	EIP16	0.813			
	EIP17	0.818			
	EIP18	0.824			
Course design Quality	CQ1	0.83	0.724	0.887	0.809
	CQ2	0.82			
	CQ3	0.81			
	CQ4	0.825			
E-Learning Satisfaction	LS1	0.773	0.653	0.88	0.867
	LS2	0.78			
	LS3	0.77			
	LS4	0.76			
	LS5	0.775			

Table 3 Correlation Coefficient

Items	1	2	3
EIP	**0.846**		
CQ	0.595	**0.772**	
LS	0.701	0.675	**0.875**

Structural Analysis

The structural model assessment was performed following Hair et al. (2019) recommendation. In order to assess the path coefficient between endogenous and exogenous constructs, the sample was bootstrapped through 5.000 sub-sampling. The results of the SRMR indicator estimating the goodness of fit of the structural model was 0.044. The SEM results show that the path between EIP and CQ significantly impacts (β=0.344, t=9.714, p>0.05), therefore, H1 was supported. The SEM results also showed that the path between EIP and DQ was significantly

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influenced (β=0.515, t=16.204, p>0.05), thus, H2 was accepted. The Mediating effects of CQ was checked between EIP and LS and found that CQ has parallel mediating relationship among EIP and LS.

Table 4 Hypothesis Testing

Items	β	t	P-value
EIP - LS	0.344	9.714	0.000
EIP - CQ	0.515	16.204	0.000

Items	β	t	LL	UL
LS	0.47	7.180	0.64	0.64

Discussion

The findings of this study provide valuable insights into the interplay between educational institutional preparedness, course design quality, and e-learning satisfaction, with specific emphasis on the nursing BS-level students at Khyber Medical University, Peshawar. This section contextualizes the results in the broader literature, addresses the implications of these findings, and identifies areas for further research.

The study confirms H1 a positive and significant relationship between institutional preparedness and e-learning satisfaction, aligning with previous research highlighting the critical role of institutional readiness in shaping online learning experiences (Kiruma, Aseey, Kyalo, & Mwangi, 2023); Mehmood, 2016). The mean score of 3.12 for institutional preparedness suggests that respondents perceive their educational institutions as moderately equipped to support e-learning. The positive impact underscores the importance of providing robust technological infrastructure, effective learning management systems, and comprehensive administrative support. These elements collectively create an environment conducive to effective online learning and are essential for addressing the challenges of rapid transitions to e-learning, as necessitated by the COVID-19 pandemic.

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The study also highlights areas needing enhancement. While institutions have made strides in preparedness, the moderate mean score suggests room for improvement in resource allocation, faculty training, and student support systems. Addressing these gaps could further enhance students' satisfaction and foster a more inclusive and effective e-learning ecosystem, especially in the context of developing countries, where digital inequality and limited technological resources often impede progress.

The results underscore the significance of course design quality in influencing e-learning satisfaction. The mean score of 3.01 for course design quality reflects a moderate level of student satisfaction, indicating the potential for better alignment of course objectives with student needs. Effective course design—including well-structured content, clear learning objectives, and interactive elements—plays a pivotal role in enhancing engagement and satisfaction. Previous literature supports these findings, emphasizing the importance of multimedia integration, usability, and consistent course layouts in fostering meaningful learning experiences (Almaiah & Alyoussef, 2019; Wright, 2003).

Furthermore, the study corroborates the notion that course design quality serves as a mediating factor between institutional preparedness and e-learning satisfaction. This interaction underscores the importance of translating institutional resources into practical, high-quality course designs to maximize student satisfaction. Institutions that prioritize iterative feedback mechanisms for course design can better adapt to evolving technological and pedagogical standards, as advocated by Elumalai et al. (2021) and Chiu et al. (2022).

The study's findings support the hypothesis that course design quality mediates the relationship between institutional preparedness and e-learning satisfaction. This relationship emphasizes the strategic role of course design in leveraging institutional readiness to improve learning outcomes. Well-prepared

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institutions that invest in course design innovations are more likely to meet students' expectations, resulting in higher satisfaction levels. This highlights the need for institutions to prioritize not only the technical aspects of e-learning but also the pedagogical strategies that enhance learner engagement and satisfaction.

Theoretical and Practical Contributions

The study makes significant theoretical contributions by integrating institutional preparedness, course design quality, and e-learning satisfaction into a cohesive framework, offering a comprehensive perspective that bridges existing gaps in e-learning literature. This framework deepens the understanding of how institutional resources and technological capabilities intersect to influence e-learning outcomes, extending traditional theoretical models. Moreover, it refines existing theories by emphasizing the mediating role of e-learning satisfaction, which highlights learner experiences as pivotal determinants of educational effectiveness in virtual environments. The findings also introduce an institutional-level approach to evaluating e-learning systems, focusing on the role of preparedness and support structures often overlooked in prior studies. By emphasizing interactive and engaging course designs, the research expands the theoretical discourse on academic achievement in digital learning contexts. Also, one of the unique contributions of this study is its focus on the context of a developing country, where challenges such as digital inequality, limited infrastructure, and resource scarcity significantly influence e-learning outcomes. The findings suggest that while institutional preparedness and course design quality positively impact e-learning satisfaction, these factors must be tailored to address the specific barriers faced by students in such contexts.

Policymakers and educational leaders should therefore adopt a localized approach, ensuring that technological solutions are accessible, inclusive, and cost-effective. From a practical standpoint, the study underscores the critical importance of faculty training programs, equipping educators with the necessary

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skills to design and deliver impactful e-learning experiences. It also provides a roadmap for educational institutions to develop user-friendly e-learning platforms that address technical challenges and foster student engagement. Highlighting the role of interactive course designs, the research suggests that institutions should invest in active learning tools and resources to create more engaging and effective learning environments. Additionally, the study offers actionable recommendations for policymakers to allocate resources toward institutional readiness, ensuring equitable access to advanced e-learning technologies. Lastly, it encourages collaboration between educational institutions and technology developers to craft customizable solutions tailored to the diverse needs of learners and educational contexts.

Limitations and Future Research Directions

Despite its contributions, the study is not without limitations. First, the cross-sectional design precludes the ability to establish causality. Future research could adopt longitudinal designs to examine changes over time. Second, the study's focus on a single institution and sample of nursing students may limit the generalizability of the findings. Expanding the sample to include diverse disciplines and institutions could provide more comprehensive insights. Third, the reliance on self-reported data may introduce bias; integrating objective measures, such as platform usage statistics, could enhance data robustness.

Future research could also explore the role of additional mediating or moderating factors, such as digital literacy and cultural attitudes towards e-learning, to enrich the understanding of e-learning satisfaction dynamics. Comparative studies examining differences between developed and developing countries could further illuminate context-specific challenges and opportunities.

Conclusion

The study highlights the pivotal roles of institutional preparedness and course design quality in shaping e-learning satisfaction. By focusing on the unique

challenges faced by students in a developing nation, it provides valuable insights for enhancing online education frameworks. Institutions aiming to improve e-learning outcomes must adopt a holistic approach that integrates technological readiness, pedagogical innovation, and inclusive strategies. These efforts will not only enhance student satisfaction but also contribute to the broader goal of equitable and sustainable education in a rapidly digitizing world.

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