

## Effectiveness of Digital Tool Features on Student Learning Outcomes in Nepalese Higher Education Institutions

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### Abstract

*Despite widespread digital tools integration in education, empirical evidence on which features significantly influence student learning outcomes in developing countries remains limited. This study examines the relationship between five digital tool features: Content Quality, Ease of Use, Interactivity, Accessibility, and Peer and Instructor Interaction and learning outcomes among students in Nepal's education sector. Using a quantitative research design grounded in Constructivism and TAM frameworks, data were collected from 362 students across universities and colleges in both urban and rural regions of Nepal through online surveys and field visits. The validated 18-item instrument demonstrated strong internal consistency (Cronbach's Alpha = 0.897). Regression analysis revealed all five features significantly predict learning outcomes, collectively explaining 47.3% of the variance ( $R^2 = 0.473$ ). Interactivity emerged as the strongest predictor ( $\beta = 0.235$ ), followed by Content Quality ( $\beta = 0.207$ ) and Ease of Use ( $\beta = 0.187$ ), while Accessibility and Peer and Instructor Interaction also contributed significantly. These findings provide empirical evidence for prioritizing interactive engagement, content quality, and usability in digital learning design. This study enriches the limited quantitative evidence on digital learning in developing countries by highlighting the critical role of interactivity, content quality, and usability in shaping student outcomes within Nepalese higher education.*

**Keywords:** Digital Learning, Educational Technology, Content Quality, Ease of Use, Interactivity, Peer and Instructor Interaction, Accessibility

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## 1. Background of the Study

Digital platforms, including learning management systems and educational applications, provide accessible environments that support student engagement and resource use in higher education. The intelligent use of digital tools by institutions and educators can significantly enhance student learning outcomes (Rafiq & Afzal, 2024). Personalised and adaptive learning act as catalysts for improving student performance and engagement (Essa et al., 2023). Digital tools offer potential through interactivity facilitated by simulations, educational games, quizzes with instant feedback, and multimedia elements that foster greater student engagement compared to passive traditional methods (Meepung et al., 2021). Tools that facilitate communication and collaboration align with constructivist learning principles emphasising social interaction in knowledge building (Palincsar, 1998) and strengthen connections between students, instructors, and peers (Gao & Shi, 2023).

Existing studies highlight challenges in implementing digital tools and reveal a lack of context-specific evidence in developing countries such as Nepal (Giri, 2021). Much of the global literature originates from advanced settings, limiting its applicability to resource-constrained contexts (Huang, 2023). Understanding whether investing in interactivity is more effective than improving interface simplicity, or if curated content has greater impact than basic accessibility, requires localized investigation considering factors like digital literacy levels, infrastructure reliability, pedagogical traditions, and linguistic diversity (Escueta et al., 2017). The absence of feature-specific research presents a fundamental obstacle to educational advancement, as each feature brings distinct impact: content quality affects knowledge accuracy and depth; ease of use determines adoption and reduces cognitive load; interactivity promotes active learning; accessibility ensures equitable opportunities; and peer and instructor interaction fosters collaborative learning and personalized support (Michelsen & Groß, 2024; Salloum & Shaalan, 2018).

This issue takes on heightened urgency in developing nations like Nepal, where the education system faces complex challenges including significant resource constraints, geographical inaccessibility for mountainous communities, and pro-

nounced disparities in infrastructure, teacher quality, and educational resources between urban and rural areas (Giri, 2021). While digital tools offer compelling potential to democratize access to learning resources and enable personalized learning (Essa et al., 2023), Nepal's digital adoption faces considerable challenges including the digital divide with uneven access to affordable internet, electricity, and suitable devices, lack of digital literacy among teachers and learners (Gurung & Shrestha, 2023; World Bank, 2023), and concerns about content quality, ease-of-use, and cost constraints (Adhikari et al., 2021). Although the COVID-19 pandemic accelerated rapid adoption of digital learning modalities (Acharya et al., 2021), domestic studies often explore adoption rates, infrastructure, or perceptions but rarely analyze how particular features influence student learning outcomes (Giri, 2021).

Therefore, this study seeks to fill this gap by systematically exploring the role of digital tools features in influencing student learning outcomes among students in Nepalese higher education, predominantly at the bachelor's level, with representation from master's and +2 programs. The primary objective of the study is to assess the impact of digital tool features on student learning outcomes in Nepal. By analysing key aspects such as content quality, ease of use, interactivity, accessibility, and peer/instructor interaction, the research provides evidence on which features should be prioritized in digital learning design. The main research question guiding this investigation is: What are the features of digital tools that have an impact on the learning outcomes of students in Nepal?

The forthcoming sections are: Theoretical Framework, Study Methods, Results and Discussion, and Concluding Remarks followed by References.

## 2. Literature Review

The integration of digital learning tools in educational contexts represents a complex intersection of pedagogical theory, technological design, and human-computer interaction. Understanding how specific features of these tools influence student learning outcomes requires a robust theoretical foundation that explains both the cognitive and social mechanisms of learning and the factors that determine technology adoption and sustained use. This study is grounded in established

theoretical frameworks from learning sciences and information systems research, which collectively provide a comprehensive lens for examining the relationships between digital tool characteristics and educational effectiveness. These theories not only justify the selection of specific features for investigation but also illuminate the pathways through which these features may influence learning processes and outcomes.

Constructivism provides a foundational perspective for understanding how learners engage with digital educational technologies. This theoretical tradition, which positions learners as active constructors of knowledge rather than passive recipients of information, has profound implications for digital tool design and implementation (Isik, 2018; Varma et al., 2023). From a constructivist perspective, learning occurs through active engagement with content, exploration of concepts, and the social negotiation of meaning. This theoretical lens directly supports the importance of examining interactivity and peer/instructor interaction as critical features of digital learning environments. Interactive elements that promote active participation—such as multimedia components, feedback mechanisms, user control options, and collaborative tools—facilitate the kind of engaged exploration that constructivist theory identifies as essential to meaningful learning. Similarly, features that enable communication and collaboration among learners and between learners and instructors create opportunities for the social negotiation of understanding that constructivism emphasizes. High-quality content that stimulates inquiry and encourages exploration further aligns with constructivist principles by providing the intellectual material necessary for learners to build and refine their understanding through active engagement. The constructivist framework thus suggests that digital tools should not merely deliver information but should create environments that support active knowledge construction through exploration, experimentation, and social interaction.

Within the constructivist framework, instructional design must fundamentally address the inherent limitations of working memory and mental processing capabilities, to facilitate meaningful learning in technology-mediated educational environments (Lopez, 2024). From this perspective, the ease of use and structural quality of digital learning tools become critical factors in learning effectiveness.

Poorly designed interfaces that are difficult to navigate, confusing organizational structures, or ambiguous content presentation create unnecessary mental effort, forcing learners to focus on figuring out how the material is presented rather than engaging with and understanding the content itself. This extraneous load consumes limited working memory resources that could otherwise be allocated to germane load, the cognitive processing directly related to learning and schema construction. Well-designed digital tools that are intuitive to use and present information in clear, well-organized ways minimize extraneous load, thereby freeing cognitive resources for deeper processing of educational content. This explains why usability and content structure are not merely matters of convenience or user satisfaction but are fundamental determinants of learning effectiveness. As learners become more familiar with a digital tool, the mental effort required to operate it decreases, freeing up cognitive resources for deeper engagement with the learning content over time. This process provides a strong rationale for examining ease of use and content quality as key factors influencing learning outcomes, since these features help optimize how efficiently learners process and absorb information.

Learning occurs primarily through social interaction and the use of tools, including digital technologies, which mediate knowledge construction (Al-Qaysi et al., 2020; Freeman, 2010). In digital learning environments, features enabling peer and instructor interaction are therefore central mechanisms for effective knowledge building. Tools that support synchronous/asynchronous communication, collaborative problem-solving, and guided feedback create supportive social contexts where learners progress most when tackling tasks slightly beyond their independent ability, with appropriate guidance from peers or instructors. Effective peer/instructor interaction thus provides essential scaffolding, making collaborative features and communication channels fundamental design elements—meaning the overall effectiveness of digital tools depends significantly on how well they facilitate meaningful social interaction and knowledge co-creation.

While constructivism explains the cognitive and social processes through which digital tool features might influence learning, technology adoption theories address the equally critical question of whether and how students will engage with

these tools in the first place. The Technology Acceptance Model (TAM), one of the most widely applied frameworks in information systems research, provides a parsimonious explanation of technology adoption based on two key constructs: perceived usefulness and perceived ease of use (Davis, 1989; Al-Qaysi et al., 2020). According to TAM, users are more likely to adopt and consistently use a technology when they perceive it as useful for achieving their goals and easy to use without excessive effort. This model directly supports the inclusion of ease of use as a key independent variable in studies of digital learning effectiveness, since ease of use not only enhances how smoothly learners can interact with the tool but also increases the likelihood and extent of adoption and sustained engagement. Furthermore, TAM suggests that other features such as content quality and interactivity likely contribute to perceived usefulness—if a digital tool provides high-quality, engaging content, students are more likely to perceive it as useful for their learning goals. This creates multiple pathways through which digital tool features influence learning outcomes: directly through their effects on learning processes, and indirectly through their effects on adoption, engagement, and sustained use. The TAM framework thus helps explain why certain features matter not only for their immediate pedagogical effects but also for their role in motivating and sustaining student engagement with digital learning environments.

Several key factors influence users' adoption and effective use of digital learning technologies (Dečman, 2015; Venkatesh et al., 2003): the degree to which they perceive the technology will provide clear benefits for their learning (performance expectancy), the ease associated with using it without excessive effort (effort expectancy), the extent to which peers, instructors, or important others encourage its use (social influence), and the availability of necessary organizational and technical support, such as reliable infrastructure and assistance (facilitating conditions). These key factors offer a more nuanced way to examine digital learning tools and their effectiveness. The perceived benefits align directly with student learning outcomes—the ultimate advantage students seek from educational technologies. Ultimately, successful implementation of digital learning tools requires careful attention to technological, social, and contextual dimensions—ensuring that perceived benefits, ease of use, social encouragement, and necessary support structures all work together to drive effective adoption and meaningful

educational outcomes.

These complementary perspectives—constructivism and TAM—explain why specific digital tool features are worth investigating and how they can influence student learning outcomes. Constructivism highlights the active role of learners in building knowledge through meaningful engagement, while TAM emphasizes that adoption and effective use depend on perceived usefulness and ease of use. Together, they illuminate the mechanisms through which features such as interactivity, peer/instructor interaction, content quality, and ease of use support deeper learning and sustained engagement in digital environments.

Building on constructivism and TAM, this study proposes a conceptual framework that examines five key features of digital learning tools as predictors of student learning outcomes. Content quality refers to the depth, currency, completeness, accuracy, and timeliness of educational materials—dimensions that consistently shows enhance students' ability to comprehend and learn effectively (Abdullah & Ward, 2016; Calisir et al., 2014; Salloum & Shaalan, 2018). Ease of use captures students' perception that interacting with digital tools requires minimal effort, which supports greater technology adoption and allows learners to direct their attention toward understanding the material rather than struggling with navigation (Chiang et al., 2019; Salloum & Shaalan, 2018). Interactivity captures bidirectional engagement through multimedia, feedback mechanisms, gamification, and collaborative tools, transforming passive consumption into active learning experiences (Kamran et al., 2023; Meepung, et al., 2021). Accessibility refers to the ease of reaching system features across technical, temporal, and usability aspects, supporting self-paced learning and material review (Alsabawy et al., 2016; Rafiq & Afzal, 2024). Peer and instructor interaction involves synchronous and asynchronous communication that promotes collaborative learning and feedback, with particularly strong evidence that peer interaction boosts academic progress and self-efficacy (Aydin, 2013; Michelsen & Groß, 2024; Mongendre, 2021).

Despite evidence linking these individual features to learning outcomes, three critical gaps persist in the literature. Most prior studies examine digital learning tool features in isolation, overlooking their combined and potentially interactive effects, which limits understanding of how these features work together in real

use. Additionally, there is little guidance on the relative importance of different features, complicating decisions about design priorities and resource allocation. Finally, contextual factors—such as infrastructure limitations and varying levels of digital literacy—are rarely considered as potential moderators of these relationships. The Nepali educational context exemplifies these challenges, where unreliable electricity and internet connectivity, uneven device access, and heterogeneous digital literacy create conditions markedly different from the resource-rich environments dominating existing research. Infrastructure constraints may amplify the importance of accessibility and ease of use, while varying digital literacy may moderate how students benefit from interactive features. Understanding how these features function in resource-constrained contexts is essential for developing inclusive digital learning solutions effective across diverse global educational settings. This study addresses these gaps by examining multiple features simultaneously within a developing country context, investigating their relative contributions to learning outcomes while accounting for the contextual factors that shape digital learning effectiveness in Nepal's higher education system.

### 3. Theoretical Framework

To investigate the multifaceted nature of digital tool effectiveness, this study is anchored in an integrated framework that draws from learning and technology adoption principles, combining Constructivism and the Technology Acceptance Model (TAM).

Constructivism positions learners as active constructors of knowledge, directly supporting the importance of Interactivity (IN) and Peer/Instructor Interaction (PI) in digital learning environments (Varma et al., 2023). Ease of Use (EU) and well-structured Content Quality (CQ) help reduce unnecessary mental effort, allowing learners to direct their cognitive resources toward deeper understanding and meaningful engagement with the material (Lopez, 2024). Constructivism provides a strong rationale for Peer and Instructor Interaction (PI), as collaborative tools enable learners to co-create knowledge through active social engagement (Al-Qaysi et al., 2020).

Models of technology adoption, particularly TAM, explain the key precursors to

effective use: Perceived Usefulness aligns directly with Content Quality (CQ), while Perceived Ease of Use corresponds to Ease of Use (EU) (Davis, 1989). Social encouragement from peers and instructors, along with reliable access and support, further supports meaningful interaction (PI) and Accessibility (AC) (Venkatesh et al., 2003). This integrated framework supports the hypothesis that positive perceptions of these five features—Interactivity, Peer/Instructor Interaction, Content Quality, Ease of Use, and Accessibility—will be associated with enhanced learning outcomes.

In developing the conceptual framework, five key variables were systematically identified to explore their potential influence on student learning outcomes. The proposed model conceptualizes content quality, ease of use, interactivity, accessibility, and peer and instructor interaction as critical dimensions that potentially mediate educational effectiveness. Each variable represents a theoretical construct designed to capture different aspects of the digital learning environment: the substantive nature of educational content, technological usability, potential for student engagement, inclusive access mechanisms, and opportunities for collaborative learning interactions. The framework posits that these interconnected variables collectively contribute to understanding the complex dynamics of student learning outcomes in contemporary educational contexts.

#### 4. Methodology

The study is based on primary data collected through questionnaires seeking information on dependent and independent variables using a Likert scale and other questions. The study used simple random sampling, surveying 362 students from higher education institutions in Nepal, predominantly at the bachelor's level, with representation from +2, master's, and above-master's programs. Respondents were drawn from both urban (79.83%) and rural (20.17%) areas, ensuring coverage of diverse institutional contexts. Data were collected using a structured questionnaire that assessed digital tool features and learning outcome

The survey comprised 18 items, including 15 items measuring five digital tool features (Content Quality, Ease of Use, Interactivity, Accessibility, and Peer and Instructor Interaction) on a 5-point Likert scale. Each feature was evaluated by

three distinct items, such as assessing Content Quality through statements about the accuracy and organization of learning materials. The Perceived Learning Outcome was measured by a 3-item scale, allowing students to self-evaluate academic benefits, including improvements in concept understanding, problem-solving skills, and overall academic performance. Both descriptive and inferential statistics were performed for data analysis. The descriptive design was adopted for finding required facts, and causal comparative research design for identifying cause-and-effect relationships between variables. The reliability results show the instrument was reliable with Cronbach’s alpha of 0.897, indicating 89.7 percent of the data are reliable and 10.3 percent is error.

**Ethical Considerations**

Ethical standards were strictly adhered to throughout the research process. Informed consent was obtained from all participants before the survey. Respondents were informed of the study’s purpose, the voluntary nature of their participation, and their right to withdraw at any time. Anonymity and confidentiality were ensured: no identifying information was collected, and data was stored securely for research purposes only. No physical or psychological harm was anticipated or reported, and findings will be reported accurately with proper attribution to avoid plagiarism.

**Data Analysis**

**Model Specification**

This study will utilize regression analysis to investigate the effect of digital tool features on educational outcomes. This method allows for the simultaneous examination of multiple independent variables and their relationship with a single dependent variable. It will assess the unique and collective effects of these predictors while controlling for their interdependencies. The proposed relationship between digital tool features and learning outcomes will be evaluated through the developed regression model.

$$LO = \beta_0 + \beta_1CQ + \beta_2EU + \beta_3IN + \beta_4AC + \beta_5PI + \varepsilon \dots\dots\dots (i)$$

Where,

Dependent Variable:

LO = Learning Outcomes

Independent Variables:

CQ = Content Quality

EU = Ease of Use

IN = Interactivity

AC = Accessibility

PI = Peer and Instructor Interaction

$\varepsilon$  = Error term

$\beta_1$ ,  $\beta_2$ ,  $\beta_3$ ,  $\beta_4$  and  $\beta_5$  are regression coefficients that indicate how much the dependent variable increases when one of these independent variables increases, while keeping the others constant.

### Quality Control Measures

The survey instrument adapted validated items from established scales (Abdullah & Ward, 2016; Davis, 1989; Venkatesh et al., 2003). Questionnaire were formed from the well-established literatures. Content validity was confirmed via expert review (educators and researchers). A pilot test ( $n = 42$ ) refined wording and verified reliability (all subscales Cronbach's  $\alpha > 0.60$ ). Data collection used standardized instructions, voluntary anonymous participation, and exclusion of incomplete or patterned responses (final  $n = 362$ ). Results include standardized  $\beta$ ,  $p < .05$ , and  $R^2$ . Interpretation considered Nepal's infrastructure constraints, digital literacy variation, and urban–rural divide, with triangulation to relevant developing-country literature.

## 5. Results and Discussion

### 5.1. Descriptive Analysis

Based on the analysis of data, the major findings of the study are summarized in Table 1. Among the 362 respondents, (74.31%) of the respondents were males and (25.69%) females. From the sample size (30.39%) of the respondents were between 15 to 20 years age groups, (51.38%) between 21-25, (15.75%) were in

26-30 and only (2.49%) of the respondents were above 30 years.

Table 1: Descriptive Analysis of the variables.

Variables	Category	Percent
Gender of respondents	Male	74.31
	Female	25.69
Age of respondents	15-20	30.39
	21-25	51.38
	26-30	15.75
	Above 30	2.49
Qualification of respondents	+2 Level	9.67
	Bachelor's Level	66.57
	Master's Level	21.27
Geographical region of respondents	Above Master's	2.49
	Rural	20.17
	Urban	79.83

Source: SPSS (2025)

In terms of educational background, (9.67%) of the respondents were +2 level passed, (66.57%) were bachelor's level educated, (21.27%) were master's level educated, and (2.49%) of the respondents had qualifications above master's level. Regarding the geographical distribution, (20.17%) of the respondents were from rural areas, whereas (79.83%) were from urban areas. The demographic composition reveals that the majority of participants were young adults pursuing or having completed their bachelor's education, predominantly from urban settings in Nepal. Out of total 362 respondents, the data indicates a significant representation of bachelor's level students who are actively engaged with digital tools in their educational pursuits. The study findings in Table 1 demonstrate that the sample population primarily consists of male respondents from urban areas, with the largest age cohort being between 21-25 years, which aligns with the typical demographic of higher education students in the Nepalese education sector. The gender distribution shows a considerably higher participation of male respondents compared to female respondents. In terms of geographical representation, urban respondents significantly outnumbered their rural counterparts, reflecting the digital divide and differential access to educational technologies across Nepal's diverse geographical landscape.

## 5.2. Inferential Analysis

In inferential analysis the following tests were conducted: Correlation Analysis, Regression Analysis and Hypothesis Testing.

The Pearson correlation analysis in Table 2 revealed moderate to strong positive associations between all independent variables and student learning outcomes (LO). The strongest correlations were observed for Interactivity ( $r=0.544$ ) and Content Quality ( $r=0.541$ ), providing robust evidence for learning theories emphasizing active cognitive involvement (Varma et al., 2023) and meaningful, relevant information (Lopez, 2024). Ease of Use ( $r=0.518$ ) demonstrated a strong correlation, reinforcing TAM (Xia et al., 2018) and highlighting that usability significantly links to learning effectiveness. Peer/Instructor Interaction ( $r=0.500$ ) showed a solid correlation, supporting Social Constructivist perspectives (Palincsar, 1998) that emphasize learning as a social process. Accessibility ( $r=0.489$ ) exhibited the weakest, though still significant, correlation among predictors, suggesting that once basic access is met, content and interactivity become stronger drivers of learning outcomes, although accessibility remains fundamental (El-mouhib & Moussa, 2024). These interconnected correlations suggest that optimizing the combination of high-quality content, usability, interactivity, accessibility, and interaction opportunities holds the greatest potential for improving student learning in the Nepalese context.

Table 2: Correlation Analysis

(Table 2 shows the relation between the variables. Where, Learning Outcome (LO) is dependent variable and Content Quality (CQ), Ease of Use (EU), Interactivity (IN), Accessibility (AC), and Peer and Instructor Interaction (PI) are independent variables. The result is based on sample size 362.)

	LO	CQ	EU	IN	AC	PI
LO	1					
CQ	.541**	1				
	0.000					
EU	.518**	.507**	1			
	0.000	0.000				

IN	.544**	.490**	.400**	1		
	0.000	0.000	0.000			
AC	.489**	.437**	.544**	.382**	1	
	0.000	0.000	0.000	0.000		
PI	.500**	.467**	.395**	.617**	.424**	1
	0.000	0.000	0.000	0.000	0.000	

Note: \*\* indicates Correlation is significant at the 0.01 level (2-tailed).

Source: SPSS (2025)

Regression analysis examined the collective and individual effects of five digital tool features on student learning outcomes. The model summary in Table 3 demonstrates a significant positive correlation with  $R^2 = 0.473$  indicating that 47.3% of learning outcome variability is explained by the independent variables. The Adjusted R Square (0.465) accounts for the number of predictors. While explaining nearly half the variance represents considerable model fit, over 50% remains unexplained by these features alone, underscoring the influence of other factors such as student motivation, prior knowledge, teaching quality, study habits, and socio-economic factors (Ancheta & Bocar, 2024). The Standard Error of the Estimate (0.598) reflects substantial unexplained variance.

Table 3: Regression analysis

Table 3 shows the result is based on the 362 sample. By using regression model:  $LO = \beta_0 + \beta_1CQ + \beta_2EU + \beta_3IN + \beta_4AC + \beta_5PI + \epsilon$ , where Learning Outcome (LO) is dependent variable and Content Quality (CQ), Ease of Use (EU), Interactivity (IN), Accessibility (AC), and Peer and Instructor Interaction (PI) are independent variables.

Variable	$\beta$	T	Sig.	F	Sig.	$R^2$
(Constant)	0.57	3.123	0.002			
CQ	0.199	4.216	<.001			
EU	0.189	3.774	<.001	63.872	< .001	0.473
IN	0.23	4.565	<.001			
AC	0.154	3.263	0.001			
PI	0.116	2.289	0.023			

Source: SPSS (2025)

The ANOVA results in Table 3 validated the model's statistical significance ( $F=63.872, p < 0.001$ ), confirming that the five predictor variables collectively predict student learning outcomes better than chance and providing compelling evidence against the null hypothesis. The dependent variable of this research is Learning Outcomes, Predictors: CQ (Content Quality), EU (Ease of Use), IN (Interactivity), AC (Accessibility), and PI (Peer and Instructor Interaction).

The regression coefficients in Table 3 revealed that all five predictors significantly influence learning outcomes. The regression model is:  $Y = 0.57 + 0.199 X_1 + 0.189 X_2 + 0.230 X_3 + 0.154 X_4 + 0.116 X_5 + \epsilon$ . Interactivity emerged as the strongest predictor ( $\beta=0.230$ ), with each one-unit increase in interactivity associated with a 0.230-unit increase in learning outcomes, supporting constructivist approaches (Meepung et al., 2021; Varma et al., 2023). Content Quality was the second strongest predictor ( $\beta=0.199$ ), underscoring the value of accurate, relevant material and aligning with instructional design principles (Calisir et al., 2014). Ease of Use ( $\beta=0.189$ ) confirmed its importance beyond initial adoption per TAM (Davis, 1986), showing its direct link to learning effectiveness (Abdullah & Ward, 2016). Accessibility ( $\beta=0.154$ ) also significantly predicted outcomes, though its contribution was less pronounced among the predominantly urban sample (El-mouhib & Moussa, 2024; Giri, 2021). Peer and Instructor Interaction ( $\beta=0.116$ ), while significant, exhibited the smallest influence, suggesting variable interaction quality via current tools or mediation through other factors like interactivity (Mongendre, 2021; Palincsar, 1998).

Table 4: Hypothesis testing.

Code	Hypothesis	p-value	Result
H1	There is a positive relationship between content quality and student learning outcomes.	$p < .001$	Accepted
H2	There is a positive relationship between system ease of use and student learning outcomes.	$p < .001$	Accepted
H3	There is a positive relationship between interactivity of the system and student learning outcomes.	$p < .001$	Accepted

H4	There is a positive relationship between system accessibility and student learning outcomes.	$p = 0.001$	Accepted
H5	There is a positive relationship between peer and instruction interaction and learning outcomes.	$p = 0.023$	Accepted

## 6. Conclusion

This empirical investigation into the Nepalese Higher Education Sector conclusively demonstrates that perceived quality of digital tool features, specifically Content Quality, Ease of Use, Interactivity, Accessibility, and Peer and Instructor Interaction have a notable, positive, and combined impact on student learning outcomes, with these five features accounting for 47.3% of the variance in learning outcomes ( $R^2 = .473$ ). Notably, Interactivity emerged as the primary determinant ( $\beta = .235$ ,  $p < .001$ ), followed by Content Quality ( $\beta = .207$ ,  $p < .001$ ) and Ease of Use ( $\beta = .187$ ,  $p < .001$ ), suggesting that tools enabling active engagement and participation yield the greatest perceived benefit for learning, surpassing even high-quality content or ease of access alone. The findings validate the relevance of established digital learning success factors within Nepal's specific socio-technical environment, confirming that despite potential infrastructural or cultural differences, core principles of effective digital pedagogy centred around content, usability, interaction, and access remain paramount.

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