Determinants of Students' Learning Satisfaction in E-learning English Class in Chongqing University, China

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Abstract

Purpose: In a public university in Chongqing, China, this study attempts to evaluate the critical factors that have a major impact on students learning satisfaction in an online English course. Key variables are course content quality, perceived ease of use, perceived usefulness, confirmation, flow experience, and students' e-learning satisfaction. **Research design, data, and methodology:** 304 students in the seven journalism college classes were the subject of an investigation by the researcher using a quantitative approach and questionnaires. Convenience, quota, and judgmental sampling techniques are utilized. Before the data collection, the item-objective congruence index (IOC) and a pilot test (n=80) were carried out. Intervention Design Implementation (IDI) was conducted among 30 participants. **Results:** The results confirm that all the factors, such as course content quality, perceived ease of use, usefulness, flow experience, and confirmation, significantly impact students' e-learning satisfaction. **Conclusions:** Administrators and faculty at public universities should focus on improving factors that affect students' satisfaction with e-learning. By improving the quality of course content, making it easier to use and more attractive, increasing its usefulness, providing confirmation, and enhancing the flow experience, they can enhance students' satisfaction with e-learning in English classes.

Keywords: E-learning, Students Satisfaction, Content Quality, Flow Experience, Intervention Design Implementation

JEL Classification Code: I23, J28, L2

1. Introduction

China's rapidly growing and highly sophisticated economy has significantly contributed to online education's rapid growth and widespread availability (Ding et al., 2010). The swift dissemination of the virus in the early months of 2020 posed significant challenges to the educational system and presented substantial barriers for institutions of higher learning. This required a quick shift to virtual learning across all levels of education, from elementary to higher education. This transition was crucial to ensure students' safety and continuity in learning during the global health crisis (Adedoyin & Soykan, 2020). As a result of the rapid expansion of China's telecommunications infrastructure, the nation has made substantial advancements in online education (Huang & Zhao, 2016).

The growing prevalence of e-learning can be attributed to the diverse range of benefits, resulting in a significant increase in its implementation across various sectors and demographics (Concannon et al., 2005). They offer customized learning experiences, instant feedback, and current content, making them an invaluable choice for organizations and institutions looking to educate many learners at the same time. E-learning offers many benefits that bolster its effectiveness and attractiveness as a means of education and training in diverse fields and industries (Bismala & Manurung, 2021).

It is crucial to note that students' satisfaction with electronic learning plays a significant role in their success in internet-based education. One of the crucial elements in guaranteeing students' success in online education is their overall satisfaction with the experience ((Martin & Bolliger,

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2022).

In e-learning, satisfaction positively impacts motivation, engagement, and academic efficacy (Bismala & Manurung, 2021). Researchers have studied satisfaction as an important variable when investigating the effectiveness of e-learning and have worked on building frameworks and models to study online student satisfaction (Sharif Nia et al., 2023).

E-learning satisfaction is an important aspect of student success in e-learning. It reflects the gap between learners learning expectations and perceived values (Martin & Bolliger, 2022). Several research studies have been conducted to explore the different factors that impact student satisfaction in electronic learning environments. According to one study, motivation, perceived utility, simplicity of use, technology quality, instructor qualities, learner dimension, environmental factors, and student preparation and skills are critical elements that affect students' happiness with e-learning (James, 2021).

This study also aims to analyze the factors influencing students' satisfaction with e-learning English classes, specifically focusing on a public university in Chongqing. The primary objective is to provide actionable insights that can assist school leaders in addressing challenges and improving the quality of e-learning within their institutions. By conducting an in-depth examination of factors such as course content quality, perceived ease of use, perceived usefulness, confirmation, and flow experience, this research seeks to equip school leaders with a comprehensive understanding of the complex dynamics at play in e-learning. The ultimate benefit to school leaders lies in the recommendations and strategies that emerge from this study. These insights can serve as a road map for educational administrators, enabling them to make informed decisions and implement effective solutions. With this knowledge, school leaders can enhance the e-learning experience for students, foster greater satisfaction, and ultimately contribute to the overall success of their educational institutions in the digital age.

2. Literature Review

2.1 Course Content Quality

Course content quality refers to the level of excellence and effectiveness of the materials and topics covered in a course. It is an essential consideration in the instructional design process. Quality content is relevant, engaging, and useful to the audience, and it helps attract users, convert them into customers, and increase retention. Course content quality includes content richness and update regularity (Lee, 2006). The definition of course content quality in the context of e-learning acceptance from a learner perspective includes factors such as the sufficiency and relevance of learning material, the current and up-to-date nature of course material, the ease of use and navigation of the e-learning platform, and the effectiveness of the user interface design (Duggal, 2022). Course content quality describes the standard of learning materials an e-learning system produces, including its content richness and frequency of updates (Cheng, 2020). The course material's accuracy, thoroughness, factuality, and informativeness are all considered aspects of course content quality (Ma et al., 2019).

H1: Course content quality has a significant impact with students' satisfaction in e-learning English class.

2.2 Perceived Ease of Use

According to Rogers (1993), perceived ease of use (PEU) represented how easy people thought it was to comprehend and use a new method. It was defined as the degree to which a person believes using a particular system would be free from effort (Davis, 1989). In other words, if the technology is easy to use, then the barriers are conquered. No one has a positive attitude towards it if it is not easy to use and the interface is complicated. It is also the extent to which a person believes using technology will be easy and require minimal effort. PEU is also mentioned in how it connects to one's assessment of the spiritual efforts made when the system is implemented (Didyasarin et al., 2017).

H2: Perceived ease of use has a significant impact with students' satisfaction in e-learning English class.

2.3 Perceived Usefulness

One of the factors produced by the technology acceptance model (TAM) is perceived usefulness (PU) (Chuttur, 2009). Fred Davis defined this as the degree to which a person believes that using a particular system would enhance their job performance (Davis, 1989). Like Davis (1993), it is the recognition that the use of new approaches can improve task accomplishment. It means whether someone perceives that technology to be useful for what they want to do. PU captures the instrumental dimension of the use of technology (Tarhini et al., 2017). In the 21st century, perceived utility is a key predictor of purpose, encouraging users of information systems to embrace more creative and user-friendly technologies that give them greater autonomy (Pikkarainen et al., 2004).

H3: Perceived usefulness has a significant impact with students' satisfaction in e-learning English class.

2.4 Confirmation

Bhattacherjee (2001) proposed that confirmation positively impacts how users view their perceived services and happiness while utilizing new technology, demonstrating the anticipated value of information system use. When learners feel that the quality of their interactions with the features of the e-learning system is better than expected, this is referred to as confirmation (Chiu et al., 2005; Roca et al., 2006). Although the theory originally appeared in the psychology and marketing literature, it has since been adopted in several other scientific fields, including consumer research and information systems (Bhattacherjee, 2001). Confirmation is defined as the summary psychological state resulting when the emotion surrounding confirmed expectations is coupled with the consumer's prior expectations about the consumption (Oliver, 1981). Put another way, it describes the sensation of having one's expectations met or surpassed after utilizing a good or service.

H4: Confirmation has a significant impact with students' satisfaction in e-learning English class.

2.5 Flow Experience

Flow experience is a concept originally introduced by Csikszentimihalyi, and it is described as a state of mind that manifests itself as the best experience that is substantially pleasurable (Csikzentimihalyi, 1975). Being in a state in which one is fully engaged in the work one does creates intense engagement, distortion of time, loss of self-awareness, and increased motivation (Csikzentimihalyi, 1975). It is also described as a phenomenon/state in which people become completely absorbed and immersed in their concerted activity (Liu et al., 2009). People feel A holistic sensation when they act with total involvement (Csikzentimihalyi, 1975). In other words, it is a psychological condition in which individuals are so completely absorbed in an activity that they experience a loss of self-awareness, a sense of control over their surroundings, and a distorting of time. People in the flow state may feel absorbed in their actions, with everything else becoming secondary (Cheng, 2021). Flow experience can be regarded as an intrinsic motivator (Huang & Hsieh, 2011). Flow can be understood as a psychological state one experiences while performing an activity. Flow increases involvement, focus, and enjoyment during the task (Hong et al., 2019).

H5: Flow experience has a significant impact with students' satisfaction in e-learning English class.
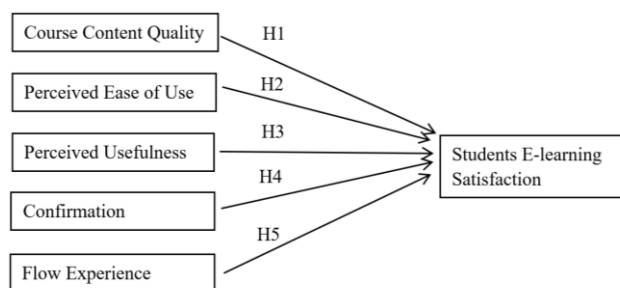
2.6 Students E-learning Satisfaction

Student e-learning satisfaction refers to the degree to which students are pleased with their experience in online learning. It is a multi-faceted concept encompassing various elements such as learner, instructor, course, program, and organizational factors in the online learning environment (Martin & Bolliger, 2022). Earner's satisfaction can be described as the degree to which a learner is delighted in participating in online learning (Ranadewa et al., 2021). Learners' satisfaction can be described as the degree to which a learner is delighted in participating in online learning (Ranadewa et al., 2021). Students' satisfaction is a short-term feeling resulting from evaluating educational experiences, services, and facilities encountered by a student during the learning process (Weerasinghe & Fernando, 2018). This indicates that one of the causes of student satisfaction is student-perceived quality (Szymanski & Henard, 2001). Satisfaction refers to the degree to which students perceive their expectations and desires regarding their higher education experience have been met (Douglas et al., 2008).

3. Research Methods and Materials

3.1 Research Framework

From the literature review, this study points out the main variables used, which include course content quality, perceived ease of use, perceived usefulness, confirmation, and flow experience. The conceptual framework was constructed from the previous research model (Cheng, 2020, 2021; Gashi et al., 2022).

Figure 1: Conceptual Framework

H1: Course content quality has a significant impact with students' satisfaction in e-learning English class.
H2: Perceived ease of use has a significant impact with students' satisfaction in e-learning English class.

H3: Perceived usefulness has a significant impact with students' satisfaction in e-learning English class.
H4: Confirmation has a significant impact with students' satisfaction in e-learning English class.
H5: Flow experience has a significant impact with students' satisfaction in e-learning English class.

3.2 Research Methodology

The research process involves four unique phases. First, data from the complete study population (n=30) was gathered to inform the suggested conceptual framework. Next, the hypotheses were evaluated using multiple linear regression, with a significance threshold set at p<0.05. Consequently, supported hypotheses were kept, and unsupported ones were discarded.

Pre-IDI surveys were administered to the remaining 80 students within the supported hypotheses in the second phase. The third phase saw the introduction and specific implementation of the Intervention Design Implementation (IDI) among 30 participants.

In the third stage, the 30 IDI participants were surveyed, providing the requisite data for a paired-sample t-test analysis. This analysis compared the results before and after the IDI, enabling a comprehensive evaluation of the study's aims and hypotheses.

3.3. Research Population, Sample Size, and Sampling Procedures

3.3.1 Research Population

Sichuan International Studies University (SISU) is a suitable target sample for our research. It is home to approximately 1,200 university students who are engaged in the study of journalism college. As part of our research objective to examine students' satisfaction with e-learning in English classes, this study focuses on a population of about 300 students in this college who have utilized the Unipus e-learning platform. According to the online statistical calculator to estimate the minimum sample size by Soper (2022), the result recommended about 80 participants. The research considered collecting 80 participants for efficient data analysis for the study. In total, 85 students received a questionnaire from Wenjuanxing. Afterward, the researcher checked all responses and confirmed that 80 responses were valid.

3.3.2 Sample size

The researcher used a pilot survey that was administered at random to thirty students in order to confirm its dependability. The researcher then distributed questionnaires to the 80 sample students. Subsequently, the investigator employed multiple linear regression analysis to examine the correlation between independent and dependent variables. Finally, 30 students who participated in the IDI intervention stage were chosen randomly.

3.3.3 Sampling Procedures

The researcher carried out multiple sampling and related sampling, and procedures were as follows:

Sampling 1: Sampling for pilot survey and pilot test

Researchers can randomly select 30 students for sampling by inviting them to complete survey questionnaires and provide feedback for pilot tests and surveys.

Sampling 2: Sampling for Pre-survey

The researcher distributed a survey questionnaire on Wenjuangxing and obtained valid data from 80 students as a sample for the pre-survey to perform multiple linear regression (MLR).

Sampling 3: Sampling for IDI

The researcher randomly selected 30 students from one class to implement IDI.

Sampling 4: Interview

The researcher randomly selected 15 students from those selected 30 students for IDI and gave the interviews to them before and after IDI.

3.4 Research Instruments

3.4.1 Design of Questionnaire

The researcher took three steps when designing the survey questionnaire.

Step 1: Find the questionnaire sources in three publicly available publications (Cheng, 2020, 2021; Gashi et al., 2022).

Step 2: Adjusting and granting learners access to questionnaire instruments.

Step 3: Implementing IOC.

3.4.2 Components of Questionnaire

Three components make up the survey questionnaire items:

Part 1: Screening inquiries. To weed out the non-research population, there were screening questions.

Part 2: Questions about basic information. Basic demographic data about the sample population, such as age and gender, was gathered through questions.

Part 3: Pre-survey Questions. Before the survey, 80 students were administered a set of pre-survey questions to ascertain their levels of Independent Variables (IV) and Dependent Variables (DV).

3.4.3 IOC Results

The researcher enlisted the services of three independent experts, which comprised scholars and professionals, to administer the Index of Item-Objective Congruence (IOC).

Among these, two individuals had no association with SISU, while the third was a professor from this university. Throughout the IOC evaluation, these autonomous evaluators assigned scores of +1 for items deemed congruent, 0 for those considered questionable, and -1 for those assessed as incongruent. Except for a singular instance, all items within the questionnaire achieved a score exceeding 0.67, indicating a substantial retention of items based on their congruence, with only one item being excluded from the study. That is to say, 21 items have been kept, but 1 item was rejected.

3.4.4 Pilot survey and Pilot test results

A pilot test was carried out with thirty individuals. According to the thumb rule of the Cronbach Alpha coefficient (Sekaran, 1992), the internal consistency in this study is expected to be at least 0.6. The results are in Table 1.

Table 1: Pilot Test Result

Variables	No. of items	Sources	Cronbach's Alpha	Strength of association
Course Content Quality (CCQ)	3	(Cheng, 2020)	0.829	Excellent
Perceived Ease of Use (PEU)	3	(Gashi et al., 2022)	0.916	Excellent
Perceived Usefulness (PU)	4	(Gashi et al., 2022)	0.946	Excellent
Confirmation (CON)	3	(Cheng, 2021)	0.948	Excellent
Flow Experience (FE)	4	(Cheng, 2021)	0.948	Excellent
Satisfaction (SAT)	4	(Cheng, 2021)	0.972	Excellent

4. Results and Discussion

4.1 Results

4.1.1 Demographic Profile

Table 2 presents the demographic characteristics of the complete study population (n=80) and the chosen group of students (n=30) who participated in the IDI, as depicted by the researcher.

Table 2: Demographic Profile

Entire Research Population (n=80)		Frequency	Percent
Gender	Male	15	18.8%
	Female	65	81.2%
Major Direction	Director	10	12.5%
	Broadcasting and hosting	10	12.5%
	International journalism	10	12.5%
	Journalism	50	62.5%
Age	18	12	15%
	19	66	82.5%
	20	2	2.5%
Total		**80**	**100%**
Suggested Strategic Plan (N=30)		Frequency	Percent
Gender	Male	8	26.67%
	Female	22	73.33%
Major Direction	Director	0	0%
	Broadcasting and hosting	12	40%
	International journalism	0	0%
	Journalism	18	60%
Total		**30**	**100%**

4.1.2 Results of multiple linear regression

The researcher conducted Multiple Linear Regression (MLR) on a total of 80 survey questionnaire results and found out whether each hypothesis was supported. There were five research hypotheses. These hypotheses were related to dependent variables and independent variables. Based on the variance inflation factor (VIF) analysis, it can be concluded that multicollinearity is not a concern since the VIF value is below 5 (Hair et al., 1995). The R-squared (R^2) in a multiple linear regression model with five independent variables can account for 65.4% of the variability in students' e-learning satisfaction.

Table 3: The multiple linear regression of five independent variables on students' satisfaction.

Variables	Standardized Coefficients Beta	t-value	P-value	VIF	R^2
Course content quality	0.226	2.99	0.004	1.08	0.654
Perceived ease of use	0.281	3.57	<0.001	1.12	
Perceived usefulness	0.310	4.36	<0.001	1.03	
Confirmation	0.339	4.14	<0.001	1.05	

Variables	Standardized Coefficients Beta	t-value	P-value	VIF	R²
Flow experience	0.232	2.96	0.004	1.04	
Dependent variable: Students' Satisfaction					

Note: p-value <0.05*, p-value <0.001**

Our research findings, which support the first five hypotheses (H1, H2, H3, H4, and H5), are significant in the field of e-learning. The association between independent variables and students' satisfaction with e-learning at the diagnosing stages is clearly demonstrated in Table 3. The significance test, conducted through multiple regression analysis using Jamovi, revealed that all of the p-values were less than 0.05. This suggests that all five of the independent variable's dimensions had a meaningful impact on the dependent variable. The regression analysis results further confirmed this, revealing that the independent factors collectively account for a substantial proportion (65.4%) of the variance in students' e-learning satisfaction (SAT), as indicated by the R-squared value of 0.654. The significant p-values ($p < 0.01$) for all five independent variables (CCQ, PEU, PU, CON, and FL) suggest that each variable has a meaningful impact on students' e-learning satisfaction. Specifically, the normalized regression coefficients (β) for CCQ, PEU, PU, CON, and FL were found to be 0.226 (p = 0.004), 0.281 (p < 0.001), 0.310 (p < 0.001), 0.339 (p < 0.001), and 0.232 (p = 0.004), respectively. Therefore, hypotheses H1 to H5 are all supported, confirming that CCQ, PEU, PU, CON, and FL significantly influence students' e-learning satisfaction.

Our research was conducted with a rigorous methodology, including multicollinearity tests of five independent variables—course content quality, perceived use of ease, perceived usefulness, confirmation, and flow experience — while using multiple regression analysis. The five dimensions' respective variance expansion coefficients, or VIF values, are 1.22, 1.33, 1.08, 1.43 and 1.32. Importantly, there was no evidence of multicollinearity between the five variables, as all of them were less than 5. This robust methodology adds to the credibility of our findings.

So, H1: Course content quality significantly impacts students' satisfaction in e-learning English classes. H2: Perceived ease of use significantly impacts students' satisfaction in e-learning English classes. H3: Perceived usefulness significantly impacts students' satisfaction in e-learning English classes. H4: Confirmation significantly impacts students' satisfaction in e-learning English classes. H5: Flow experience significantly impacts students' satisfaction in e-learning English classes. The five are supported by the multiple linear regression (MLR) results.

4.2 IDI Intervention Stage

The IDI Intervention plan, spanning 14 weeks, was crafted to meet the study's objective of gathering quantitative and qualitative data during the pre-IDI phase. The aim was to enhance student self-leadership and boost innovation. Figure 2 depicts the chronological sequence of the IDI intervention, as illustrated by the researcher.
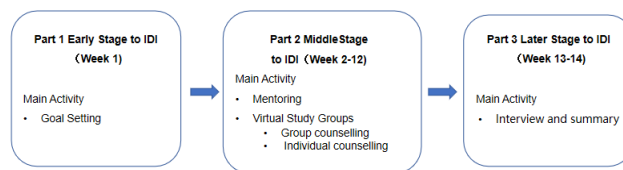

Figure 2: IDI Activities

4.3 Results Comparison between Pre-IDI and Post-IDI

To evaluate the variations in students' satisfaction with e-learning from the pre-IDI to post-IDI phases, a paired-sample t-test analysis was performed on the six variables. The subsequent tables present the outcomes of the paired-sample t-test analysis for the variables above.

Table 4: Paired-Sample T-Test Results

Variables	Mean	SD	t-value	Sig.
Pre-course content quality				
Current Situation	4.19	0.547	-1.77	0.088
Expected Situation	4.00	0.565		
Perceived ease of use				
Current Situation	4.78	0.343	-9.80	<0.01
Expected Situation	3.91	0.471		
Perceived Usefulness				
Current Situation	4.87	0.313	-15.90	<0.01
Expected Situation	3.62	0.364		
Confirmation				
Current Situation	4.41	0.426	-4.05	<0.01
Expected Situation	4.02	0.471		
Flow Experience				
Current Situation	3.75	0.609	-2.64	0.013
Expected Situation	3.53	0.691		
E-learning				

Variables	Mean	SD	t-value	Sig.
Current Situation	4.03	0.468	-3.74	<0.01
Expected Situation	3.70	0.559		

Table 4 illustrates the results of the paired-sample t-test analysis of pre-IDI and post-IDI comparison as follows:

Our analysis of the paired-sample t-test results reveals no significant increase in course content quality at the post-IDI stage (M=4.19, SD=0.547) compared to the pre-IDI stage (M=4.00, SD=0.547). The t-value is -0.177, and the p-value is 0.088. The mean difference is -0.189. Therefore, it's important to note that there is no significant difference in course content quality between the pre- and post-IDI stages, as the p-value is more than 0.05.

Our research journey took us to the post-IDI stage, where we observed a significant and impactful increase in the perceived ease of use (M=4.78, SD=0.343) compared to the pre-IDI stage (M=3.91, SD=0.471). The t-value is -9.80, and the p-value is less than 0.01. The mean difference is -0.867. This led us to the conclusion that there is a significant and meaningful difference in the perceived ease of use between the pre-IDI and post-IDI stages, as the p-value is less than 0.05.

There is a significant increase in perceived usefulness at the post-IDI stage (M=4.87, SD=0.313) than the pre-IDI stage (M=3.62, SD=0.364); t-value =-15.90, p < 0.01. The mean difference is -1.250. Therefore, hypothesis 3: A significant difference in perceived usefulness between Pre-IDI and Post-IDI stages, based on a P value< 0.01, less than 0.5.

There is a significant increase in confirmation at the post-IDI stage (M=4.41, SD=0.426) than the pre-IDI stage (M=4.02, SD=0.471); t-value =-4.05, p < 0.01. The mean difference is -0.389. Therefore, hypothesis 4: There is a significant difference in conformation between the Pre-IDI and Post-IDI stages, based on a P value<0.01, less than .05.

There is a significantly higher flow experience at the post-IDI stage (M=3.75, SD=0.609) than at the pre-IDI stage (M=3.53, SD=0.691); t-value =-2.64, p = 0. 013. The mean difference is -0.217. Therefore, hypothesis 5: There is a significant difference in flow experience between the pre- and post-IDI stages, based on a P value of 0.013, less than .05.

Based on the meticulous findings of the paired-sample t-test as detailed above, the researcher has formulated the following robust conclusions. Primarily, except course material quality, a notable mean difference was observed in most variables between the pre-IDI and post-IDI stages.

5. Conclusions, Recommendations and Limitations

5.1 Conclusions & Discussions

This study introduces a novel model to assess the influence of course content quality, perceived ease of use, usefulness, confirmation, and flow experience on students' e-learning satisfaction. The data was collected twice, pre and post-IDI, using the same online questionnaire for analysis. The results reveal that the key factors affecting students' e-learning satisfaction are perceived usefulness, ease of use, confirmation flow experience, and course content quality. Notably, after IDI, there is a significant increase in perceived usefulness, followed by perceived ease of use and confirmation flow experience, but not in course content quality.

The findings of this study, which highlight the significant relationship between course content quality and students' e-learning satisfaction, have practical implications for educational institutions. These results align with previous research (Cheng, 2020; Joo & Choi, 2016; McGorry, 2003), suggesting that universities should focus on providing instruction that emphasizes how online resources, including course content, can address information needs arising from academic tasks. The research underscores that the quality of learning content generated by the e-learning system directly influences students' satisfaction with the system. While the students expressed satisfaction with their course content quality before IDI, there was no significant difference after IDI was implemented, indicating that the intervention on course content quality did not significantly improve their satisfaction.

This study reaffirms the significance of perceived ease of use in influencing students' e-learning satisfaction, a finding that is consistent with previous research (Ifinedo, 2017; Kashive & Mohite, 2023; Riyath et al., 2022; Zaidi et al., 2021;). These studies suggest that to enhance user satisfaction with e-learning systems; universities should improve the perceived usefulness and ease of use of mobile technologies among students. Making the system more user-friendly and easier will likely increase user satisfaction and positive attitudes towards e-learning. The observation, interview, and pre-IDI data indicate a significant impact of perceived ease of use on students' e-learning satisfaction but also room for improvement. Post-IDI, a significant mean difference is observed, indicating the effectiveness of the intervention implementation.

The results from the data show a significant relationship between perceived usefulness and students' satisfaction. This result is in line with findings from prior studies where the

authors recommend that higher educational institutes (HEIs) provide training about the platform before teaching online to enhance perceived usefulness (Holden & Rada, 2011; Kashive & Mohite, 2023; Riyath et al., 2022). When users perceive technology as useful in fulfilling their needs and tasks, it can increase satisfaction. In the context of online learning platforms like Zoom, if students perceive Zoom as useful for their educational needs, it may contribute to their overall satisfaction with the platform and their online learning experience (Riyath et al., 2022).

Based on the analysis of observations, interviews, and pre-intervention data, it's evident that perceived usefulness strongly influences students' satisfaction with e-learning. However, there remains room for improvement in this regard. Following the intervention and subsequent interviews and data collection, a notable mean difference is observed, indicating the effectiveness of the implemented intervention.

One of the interesting findings associated with confirmation positively predicts students' satisfaction. This result is analogous to results from (Al Amin et al., 2023; Cheng, 2019; Ifinedo, 2017), where the researchers emphasize that confirmation plays a crucial role in the users' perception of the expected benefits of using a technology platform and its actual performance. When students feel that their expectations have been met through their experience using the system, it can lead to higher satisfaction. Therefore, e-learning systems must focus on meeting and exceeding users' expectations to enhance their satisfaction levels (Cheng, 2019).

Based on the analysis of observations, interviews, and pre-IDI data, confirmation influences students' satisfaction with e-learning, although there remains room for improvement. Post-IDI, through interviews and data analysis, a substantial mean difference is observed, indicating the effectiveness of the intervention implementation.

The results confirm that flow experience significantly predicts students' satisfaction. This result is consistent with Al Amin et al. (2023), where the authors encourage the university leader to help students enter a state of flow with competence, autonomy, relatedness, and presence. Flow, in turn, reflects the level of satisfaction with the course.

The psychological state in which students are so intensely involved in an activity that they lose self-consciousness, feel in control of their environment, and experience a time distortion is emphasized. When in the flow state, individuals may feel completely immersed in their activity, and their focus is narrowed to the activity itself. The more students are involved in this state, the more satisfaction they show (Cheng, 2021).

Based on our observations, interviews, and pre-IDI data findings, flow experience plays a significant role in determining students' satisfaction with e-learning. However, there is still room for improvement in this regard. Following

the IDI, interviews, and data collection reveals a notable mean difference, suggesting the intervention is effective.

5.2 Recommendations

The rise of technology reshapes education, especially through the growing use of online learning, marking a significant shift in teaching methods. This evolution underscores the need to enhance student satisfaction in e-learning, directly impacting academic success. The interplay between technology and pedagogy calls for educational institutions to focus on improving digital learning experiences. Embracing technology while maintaining educational quality is crucial, requiring a balanced approach that incorporates research, theory, and practice to meet the diverse needs of learners and advance academic excellence.

Maximizing e-learning in higher education demands a concerted effort to enhance course content quality, user experience, and the supportive ecosystem of faculty guidance and peer collaboration. These initiatives, aimed at improving students' perceptions of ease, usefulness, and engagement, necessitate proactive leadership and strategic resource allocation. Universities must foster innovation and excellence through continuous assessment and refinement of their digital learning environments. By placing these areas at the forefront, institutions can spearhead educational innovation and bolster student success in the digital age.

5.3 Limitations for Future Research

This study, focused on one department's students and their engagement through learner-content and learner-learner interactions, identifies limitations that future research should address. Notably, broader participant selection across departments could yield more comprehensive insights, aligning with findings by Panigrahi et al. (2022) on the significance of varied interaction types on student engagement. Further, the effectiveness of interactive teaching strategies in non-vivid, theoretical courses requires exploration to accommodate different curriculums. Additionally, extending the scope to include pre-class, in-class, and post-class interactions could more fully realize a student-centered teaching approach.

This study, limited by its focus on a single department and a small sample size of 80 students, suggests that future research should broaden its participant base across various departments and increase the sample size to enhance the generalizability and reliability of findings. Diversifying the sample will provide a richer understanding of student experiences and perspectives, allowing for more nuanced analyses. Additionally, while significant relationships were found between e-learning satisfaction and several variables, inconsistencies in the impact of course content quality post-

intervention indicate a need for further exploration into effective teaching strategies that enhance e-learning satisfaction. Moreover, extending research to encompass both online and offline learning strategies could offer comprehensive insights into optimizing student learning experiences, suggesting a holistic approach to examining educational practices.

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