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Examination of Influencing Factors of Postgraduate Students' E-learning Satisfaction, and Continuance Intention in Chengdu, China

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Abstract

Purpose: This study aims to investigate the factors that influence e-learning satisfaction, and continuance intention among postgraduate students in Chengdu, China. The key variables are system quality, information quality, confirmation, service quality, perceived usefulness, students' satisfaction and continuance intention. **Research Design, Data, and Methodology:** Quantitative methods and questionnaires were used to collect sample data. Before distribution, the questionnaire underwent content validity and reliability testing through item-objective congruence and pilot tests. Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM) were employed to analyze the data, validate the model's goodness of fit, and establish the causal relationship among variables for hypothesis testing. **Results:** The findings of this study demonstrate that system quality, confirmation, service quality and perceived usefulness are identified as the most significant factors influencing e-learning satisfaction and continuance intention among students. E-learning satisfaction was found to be the most influential predictor of continuance intention, both directly and indirectly. However, information service has no significant influence on students' satisfaction. **Conclusions:** Based on these findings, it is recommended that developers of cloud-based e-learning systems in higher education institutions prioritize the enhancement of quality factors to ensure students perceive the system as useful. This, in turn, will further enhance perceived usefulness and continuance intention towards using cloud-based e-learning systems.

Keywords: E-Learning, Satisfaction, Perceived Usefulness, Continuance Intention, China

JEL Classification Code: E44, F31, F37, G15

1. Introduction

E-learning or online learning integrates technology and education. It is not just an avenue to facilitate professional growth but is also an excellent instrument for career advancement (Andriotis, 2022). Like other countries, the pandemic forced all higher education institutes in China to take learning management systems for online education. Compared to traditional electronic learning (e-learning), cloud-based e-learning can enable users to access, save, retrieve, and share all kinds of teaching materials and learning resources on the cloud anywhere at any time without limitations (Wang et al., 2016). Hence, introducing cloud-based e-learning systems may become a more flexible and scalable solution for organizations without the huge overhead of expensive devices, low network transmission rate, and limited storage capacity associated with traditional e-learning systems. This is why many educational institutions have implemented cloud-based e-learning to enable students to learn from anywhere and at any time (Shiau & Chau, 2015). Surely, increasing attention is paid to cloud-based e-learning as a flexible and scalable way of developing education programs for users in educational settings, and it has been accepted by its intended users. Further, to better explain postgraduate students' cloud-based e-learning continuance intention, the paper starts with a review of the literature, and then the conceptual framework

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has been proposed. After that, the research methodology is discussed, and then data analysis and results are presented.

The central research problem addressed by this study is the need to comprehensively understand the factors that influence e-learning satisfaction and continuance intention among postgraduate students in Chengdu, China. While e-learning has become an integral part of higher education, there is a gap in knowledge regarding the specific variables, such as system quality, information quality, confirmation, service quality, and perceived usefulness, that play a crucial role in shaping the satisfaction levels and continuance intentions of postgraduate students engaging in e-learning in Chengdu.

The existing literature lacks a thorough exploration of the interplay among system quality, information quality, confirmation, service quality, perceived usefulness, and their collective impact on students' satisfaction and continuance intention in the context of e-learning in Chengdu, China. Previous studies have often focused on specific factors in isolation, and there is a need for a comprehensive examination of how these variables interact within the unique socio-cultural and educational landscape of Chengdu. Identifying this research gap is essential for developing targeted strategies and interventions to enhance the effectiveness and sustainability of e-learning programs for postgraduate students in Chengdu.

This study holds significant importance for various stakeholders, including educational institutions, policymakers, and e-learning providers. By investigating the specific factors influencing e-learning satisfaction and continuance intention among postgraduate students in Chengdu, the study aims to provide insights to educational institutions in Chengdu on the critical factors that contribute to postgraduate students' satisfaction and their intention to continue using e-learning platforms. This knowledge can guide the development of more effective and student-centric e-learning programs.

2. Literature Review

2.1 System Quality

DeLone and McLean (2003) introduced a model for improving and managing information systems. Their model, widely acknowledged in Information Systems (IS), has attracted considerable attention from scholars. It assesses the impact of information, system, and service quality on learners' satisfaction and their desire to continue using the system. Scholars have applied the DeLone and McLean model to various information systems, with positive effects observed between user usage and system quality (Cidral et al., 2020). Additionally, researchers have connected this model with different teaching models or theories, finding that when users are satisfied with the interaction of the user system in an information technology environment, they experience a sense of happiness and become fully engaged and immersed in the technology (Alsabawy et al., 2016; Cheng, 2014a; Lin & Chen, 2012). Gao et al. (2015) suggest that the quality of financial service systems directly affects users' participation, immersion, and overall pleasant experience. Numerous studies on digitalization have confirmed the significant positive impact of system quality on user satisfaction (Alsabawy et al., 2016). In the context of e-learning systems, the close relationship between system quality and its application has been demonstrated (Marjanovic et al., 2015). Hence, this study put forwards a hypothesis:

H1: System quality has a significant influence on students' satisfaction.

2.2 Information Quality

For instance, students can utilize the system to acquire essential knowledge. It is widely accepted that the information quality of a system plays a crucial role in determining users' satisfaction and intention to reuse the system (Cheng, 2012). Zhou (2011) asserts that when a financial information system or technology provides high-quality information that is accurate, complete, and regularly updated, it meets user expectations, enhances the perceived availability of information technology, and contributes to user satisfaction. The impact of information quality on user satisfaction is also emphasized in other studies (Cidral et al., 2018). Conversely, accurate and timely information significantly increases customer satisfaction, as customers expect reliable and timely information from mobile payment systems (Gao et al., 2015). Users begin interacting with an information system with high expectations, which can rise or fall during usage. The quality of information directly influences users' expected value. Aparicio et al. (2016) found that information quality is decisive in explaining consumer satisfaction with mobile payments. Additionally, Zhang et al. (2017) argue that high-quality information enhances users' satisfaction with virtual community services. Hence, this study put forwards a hypothesis:

H2: Information quality has a significant influence on students' satisfaction.

2.3 Service Quality

The quality of service provided by the platform significantly influences users' perceived identity and cognitive usefulness. The level of service quality has a profound impact on users, as higher quality leads to increased user expectations and a greater realization of its

impact on their experience. Research conducted by Alali and Salim (2013) in a health forum highlighted the strong impact of service quality on user satisfaction. Rahi et al. (2019) suggests that high-quality service in financial systems and information technology generates a sense of usefulness among users, driving greater adoption, provided that it delivers satisfactory and high-quality services. When consumers perceive mobile payment service providers to ensure service quality, it enhances customer satisfaction and credibility, leading to continued usage and integration of mobile payments within the IS/IT interaction (Gao et al., 2015). In the context of information systems, studies have shown that service quality in e-learning environments positively affects student satisfaction (Poulova & Simonova, 2014), with surveys indicating a strong desire among students to use e-learning systems (Cheng, 2012; Hassanzadeh et al., 2012). Yang (2015) integrated the extensional ECM-IT model and successful DM ISSM model to construct a research model for understanding the continuance intention of mobile reading users, highlighting the significant impact of various functions in reading services, such as service content, overall interface, and personalized service. Service quality specifically focuses on the influence of personalized reading and socialized interactive services on user satisfaction. Targeted reading services have been found to increase user satisfaction, indicating that user subscription and personalized recommendation services provided by content aggregation APP service providers are recognized by users and contribute to improved user satisfaction. Hence, this study put forwards a hypothesis:

H3: Service quality has a significant influence on students' satisfaction.

2.4 Confirmation

In information systems, empirical studies on the expectation-confirmation model (ECM) have shown that expectation confirmation can enhance consumer satisfaction. Specifically, when users' expectations are confirmed, it indicates that they have certain expectations and a positive user experience during the system's usage, leading to increased recognition and satisfaction with the system. If users have high expectations for the system, which are met with a positive user experience, it results in high satisfaction. For example, Lin and Wang (2012) investigated students' willingness to continue engaging in blended teaching using the IS success model, technology-to-fit (TTF) model, and ECM. Their findings demonstrated that students' perception of system fit confirmed their usage. In a study by Yang (2015) focusing on MOOC users, a research model was constructed to explore internal motivators, basic psychological needs, and MOOC design factors regarding sustainable use and autonomy in information systems. The results revealed that anticipatory identification significantly influenced cognitive effectiveness, satisfaction, and intrinsic motivation, subsequently affecting users' willingness to continue using MOOCs. Lin and Wang (2012) extended the ECM by incorporating social network variables like interest and interaction into the research environment for continuous learning. They established a conceptual model using structural equation modeling and found that curriculum content and user experience significantly influenced students' perceived satisfaction. The study also confirmed the traditional effect of perceived satisfaction on the intention to continue using the system, thereby reaffirming the significant influence of utility and expectation confirmation on perceived satisfaction. Hence, this study put forwards hypotheses:

H4: Confirmation has a significant influence on students' satisfaction.

H5: Confirmation has a significant influence on perceived usefulness.

2.5 Perceived Usefulness

The expectation validation model supports the impact of expectation confirmation on perceived usefulness, either directly or indirectly (Bhattacherjee, 2001). In the context of e-learning platforms, perceived usefulness refers to enhancing learning efficiency and improving learning outcomes for users. The technology acceptance model emphasizes the importance of perceived usefulness and ease of use as key indicators. Cheng et al. (2019) highlighted that users' confirmation experience significantly contributes to their understanding of information technology and allows for timely adjustments. Users' expectations of information technology undoubtedly influence their perception of its usefulness. Wang et al. (2017) confirmed that if users believe cloud services can enhance their work performance, they are more likely to continue using them, positively influencing their perception of cloud computing. Cheng (2014b) argues that users' perceived value of information technology is crucial in improving their satisfaction. Users generally express satisfaction with various functions of cloud computing and develop a strong dependence on it, as they believe that the greater the functionality of cloud computing, the more satisfied they will be. Cai and Wang (2022) introduced the technology acceptance model (TAM) into international research on Chinese teaching. They established a theoretical model to examine Chinese students' willingness to engage in online teaching, assessing their satisfaction with online courses and validating their appropriateness. The empirical study revealed that learners' willingness to learn is acceptable, although their desire for persistence is low. Perceived usefulness and ease of use positively influence

learners' inclination to use online courses. The interaction between these factors mutually benefits cognitive style and technical support. Hence, this study put forwards a hypothesis:

H6: Perceived usefulness has a significant influence on students' satisfaction

2.6 Students' Satisfaction

Extensive research has demonstrated that various factors contribute to user satisfaction in online education. Factors such as the breadth of content, suitability for online teaching, ease of use, and the timeliness of information have been identified as important determinants of user satisfaction (DeLone & McLean, 1992). Additionally, studies have consistently shown that system quality, usage, user attitude, and behavior significantly influence user satisfaction, ultimately impacting the consistent use of online learning systems. Students' satisfaction with the learning system is closely tied to their expectations, and when they are satisfied with the system, they are more likely to continue using it (Lee et al., 2018). According to Cheng (2021), user satisfaction with an e-learning system directly influences their willingness to continue using it. In other words, internal satisfaction with the system acts as a motivating factor for sustained usage. Tan and Kim (2015) argue that user satisfaction with information systems and technology is contingent upon their expectations.

Similarly, customers' satisfaction with cloud services depends on their expectations of the benefits derived from such services. To better understand college students' satisfaction with online teaching, Chow and Shi (2014) conducted a survey that revealed a positive correlation between system satisfaction and consistent usage. The researchers also found that users' positive experiences can influence their perceived personal outcomes. The belief that e-learning can enhance performance has also been identified as a key driver for continued usage (Lin & Wang, 2012). Hence, this study put forwards a hypothesis:

H7: Students' satisfaction has a significant influence on continuance intention.

2.7 Continuance Intention

In MOOCs, the willingness to continue using a course refers to a learner's desire to continue learning even after the course has yet to be completed (Joo et al., 2018). Research indicates that users' intention to continue using a MOOC positively impacts their behavioral changes. Zhang et al. (2016) found that students' perceived activity experience and satisfaction with the learning process significantly enhance their interest in learning. Cui et al. (2017) discovered that satisfaction, perceived effectiveness, inter-psychological experience, and expectations all positively influence students' willingness to continue using a learning platform. Using the technology acceptance model, Chen et al. (2018) examined the sustainable use of open teaching on large network platforms by incorporating autonomy and psychological flow theories. Yang (2016) introduced elements related to learners' basic psychological needs, service platform design, and subjective factors to investigate the criteria influencing learners' willingness to continue learning in MOOC platforms based on relevant teaching theories. Zhang et al. (2016) integrated perceived interactivity and "perceived happiness" into the theoretical framework of the technology acceptance model and explored their impact on MOOC learners' desire to continue learning. The results revealed a clear correlation between students' learning attitude and their intention to continue learning. The main factors influencing students' desire to continue learning are perceived availability and the ease of use of the web platform.

3. Research Methods and Materials

3.1 Research Framework

The research model proposed in this study is based on an extended version of the Technology Acceptance Model (TAM) and incorporates elements from the updated DeLone and McLean successful models. TAM is widely used to explain the acceptance and adoption of Information Systems (IS) by analyzing the factors influencing users' adoption. It provides a theoretical foundation for understanding the external factors that affect users' attitudes and intentions and has been extensively utilized to predict the usage of information technology. Drennan et al. (2005) note that TAM was initially developed to study technology acceptance in business environments. However, it has also been demonstrated to be a suitable model for examining technology acceptance in educational settings. Additionally, the research model in this study draws from three theoretical frameworks employed in previous studies.

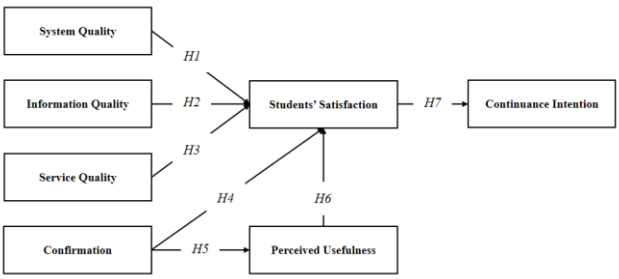

Figure 1: Conceptual Framework

H1: System quality has a significant influence on students' satisfaction.
H2: Information quality has a significant influence on students' satisfaction.
H3: Service quality has a significant influence on students' satisfaction.
H4: Confirmation has a significant influence on students' satisfaction.
H5: Confirmation has a significant influence on perceived usefulness.
H6: Perceived usefulness has a significant influence on students' satisfaction
H7: Students' satisfaction has a significant influence on continuance intention.

3.2 Research Methodology

This study utilized empirical analysis and quantitative methods to examine the research questions. Data was collected from the target population through a questionnaire. Prior to large-scale data collection, the questionnaire underwent content validity and reliability checks, including the Item-Objective Congruence (IOC) test and a pilot test of Cronbach's Alpha. Once the reliability of the questionnaire was confirmed, it was distributed online to postgraduate students at Chengdu University, with a focus on four core majors: Art, Education. The respondents were required to have at least one year of e-learning experience.

The evaluation of item-objective congruence (IOC) indicated that every scale item received a rating of 0.6 or greater, as assessed by three expert raters. Following this, the pilot test, which involved 50 participants, showcased strong internal consistency for all items, with Cronbach's alpha coefficients surpassing or equaling 0.7, as reported by Hair et al. (2010).

To analyze the sample data, the study adopted the two-step approach Anderson and Gerbing (1988) proposed in the Structural Equation Model (SEM) method. The first step involved using SPSS and AMOS to conduct Confirmatory Factor Analysis (CFA) and assess convergent validity. In the second step, SEM was employed to explore the causal relationships between the constructs in the conceptual model and test the significance of the proposed hypotheses. SEM is particularly useful when investigating models with direct and indirect influences among various structures (Hair et al., 2010).

3.3 Population and Sample Size

For this study, a convenience sample of 500 postgraduate students aged 18 to 25 was collected. These students were from four main subjects at Chengdu University in China and had prior experience using e-learning systems. The sample size was determined based on the A-priori Sample Size Calculator for SEM by Soper (2006), which recommended a minimum sample size of 425 given the parameters of 7 latent variables and 26 observed variables at a probability level of 0.05. To ensure familiarity with learning management systems (LMS) and interactive experience with LMS, participants were selected based on their prior e-learning experience. The questionnaires were distributed and valid responses were screened from the 500 participants.

3.4 Sampling Technique

The sample for this study was selected using a combination of multistage sampling techniques, including judgment sampling, stratified random sampling, and convenient sampling. Initially, judgment sampling was employed to select four main subjects from Chengdu University in China. Subsequently, stratified random sampling was utilized to determine the sample size from each institution or sample stratum, as detailed in Table 1. These sampling techniques ensured a representative and diverse sample for the study. Convenience sampling is employed by online survey distribution to reachable student group.

Table 1: Sample Units and Sample Size

Subjects	Population Size	Proportional Sample Size
Art	335	140
Management	264	110
Economics	278	116
Education	323	134
Total	**1200**	**500**

Source: Constructed by author

4. Results and Discussion

4.1 Demographic Information

Table 2 presents the demographic profile of the total 500 respondents in this study. Out of the 500 respondents, 351 were female, representing 70.20% of the sample, while 149 were male, accounting for 29.80% of the sample. In terms of age, 0.00% of the respondents were under 18, 70.80% were between 18 and 23, and 29.20% were above 23.

Regarding the frequency of using the cloud-based e-learning system, 61.40% of the respondents reported using it several times a month, 8.20% reported using it once a week, 20.60% reported using it several times a week, 3.80% reported using it once a day, and 6.00% reported using it several times a day. These figures provide insights into the

characteristics and usage patterns of the study participants.

Table 2: Demographic Profile

Demographic and General Data (N=500)		Frequency	Percentage
Gender	Male	149	29.80%
	Female	351	70.20%
Age	under 18	0	0.00%
	18-23	354	70.80%
	above 23	146	29.20%
Frequency of using the cloud-based e-learning system	Several times a month	307	61.40%
	Once a week	41	8.20%
	Several times a week	103	20.60%
	Once a day	19	3.80%
	Several times a day	30	6.00%

Source: Constructed by author

4.2 Confirmatory Factor Analysis (CFA)

Confirmatory Factor Analysis (CFA) is considered a crucial step in Structural Equation Modeling (SEM) and is used to assess the reliability and validity of variables (Byrne, 2010; Hair et al., 2010). Convergent validity, which indicates the degree to which different measures of the same construct are related, can be evaluated through various statistical measures such as Cronbach's Alpha reliability, factor loading, average variance extracted (AVE), and composite reliability (CR) (Fornell & Larcker, 1981).

In this study, all individual items demonstrated factor loadings above 0.50, most exceeding 0.75, as shown in Table 3. These factor loadings indicate strong significance (Hair et al., 1998). Additionally, the recommended threshold for composite reliability (CR) is 0.8 or higher, and for average variance extracted (AVE), it is greater than or equal to 0.5 (Fornell & Larcker, 1981; Hair et al., 1998). In Table 3, all estimates were found to be significant, as the CR values exceeded 0.7 and the AVE values exceeded 0.5. These results provide evidence of the reliability and validity of the measurement model.

Table 3: Confirmatory Factor Analysis Result, Composite Reliability (CR) and Average Variance Extracted (AVE)

Variables	Source of Questionnaire (Measurement Indicator)	No. of Item	Cronbach's Alpha	Factors Loading	CR	AVE
System Quality (SYSQ)	DeLone and McLean (2003)	3	0.799	0.593-0.901	0.824	0.616
Information Quality (IQ)	DeLone and McLean (2003)	4	0.854	0.645-0.873	0.858	0.605
Service Quality (SERQ)	DeLone and McLean (2003)	4	0.805	0.606-0.812	0.810	0.519
Confirmation (CONf)	Bhattacherjee (2001)	3	0.840	0.786-0.818	0.841	0.638
Perceived Usefulness (PU)	Davis (1989)	4	0.876	0.683-0.895	0.877	0.643
Students' Satisfaction (SATISf)	Bhattacherjee (2001)	4	0.849	0.570-0.859	0.856	0.604
Continuance intention (CI)	Bhattacherjee (2001)	4	0.867	0.743-0.859	0.868	0.623

Moreover, the findings displayed in Table 4 indicate that all important thresholds for the absolute fit indicators, namely CMIN/DF, GFI, AGFI, and RMSEA, as well as the incremental fit measures such as CFI, NFI, and TLI, meet the necessary criteria. As a result, all of these goodness-of-fit measures utilized in the confirmatory factor analysis (CFA) assessment suggest a satisfactory fit.

Table 4: Goodness of Fit for Measurement Model

Fit Index	Acceptable Criteria	Statistical Values
CMIN/DF	< 5.00 (Al-Mamary & Shamsuddin, 2015; Awang, 2012)	796.788/278 or 2.866
GFI	≥ 0.85 (Sica & Ghisi, 2007)	0.898
AGFI	≥ 0.80 (Sica & Ghisi, 2007)	0.872
NFI	≥ 0.80 (Wu & Wang, 2006)	0.884
CFI	≥ 0.80 (Bentler, 1990))	0.921
TLI	≥ 0.80 (Sharma et al., 2005)	0.908
RMSEA	< 0.08 (Pedroso et al., 2016)	0.061
Model Summary		**In harmony with empirical data**

Remark: CMIN/DF = The ratio of the chi-square value to degree of freedom, GFI = Goodness-of-fit index, AGFI = Adjusted goodness-of-fit index,, NFI = Normed fit index, CFI = Comparative fit index, TLI = Tucker-Lewis index and RMSEA = Root mean square error of approximation.

Discriminant validity, as a specific type of validity, plays a crucial role in evaluating a structure in a distinct and unique manner, revealing phenomena that cannot be captured by other measures (Hair et al., 2010). Discriminant constructs help validate differences and relationships between variables, allowing for an examination of the associations among variables. This enables the identification of any irrelevant or unexpected constructs that may be absent from the model. It is worth noting that there exists a positive relationship between strong and convergent construct validity, as well as a significant correlation with discriminant construct validity (Studenmund, 1992).

Table 5: Discriminant Validity

	SYSQ	IQ	SERQ	CONF	PU	SATISF	CI
SYSQ	**0.785**						
IQ	0.306	**0.778**					
SERQ	0.327	0.311	**0.720**				
CONF	0.356	0.199	0.201	**0.799**			
PU	0.309	0.225	0.243	0.356	**0.802**		
SATISF	0.318	0.191	0.187	0.303	0.261	**0.777**	
CI	0.324	0.121	0.114	0.188	0.18	0.264	**0.789**

Note: The diagonally listed value is the AVE square roots of the variables
Source: Created by the author.

4.3 Structural Equation Model (SEM)

This study analyzed the collected data using Structural Equation Modeling (SEM). SEM offers several strengths that contribute to its effectiveness. SEM allows for exploring dependent relationships (Hair et al., 2010). Secondly, it enables the examination of causal relationships among both latent and observed variables. Thirdly, SEM incorporates random error in observed variables to provide more accurate measurement results. Fourthly, it utilizes multiple indicators to measure latent variables. Lastly, SEM allows for hypothesis testing at the construct level rather than solely at the item level (Hoyle, 2011).

The goodness of fit for the structural model was assessed and presented in Table 6. The statistical values obtained were as follows: CMIN/DF = 3.491, GFI = 0.861, AGFI = 0.833, NFI = 0.852, CFI = 0.889, TLI = 0.877, and RMSEA = 0.071. These fit indices exceeded the acceptable thresholds, thus confirming the model's fitness.

Table 6: Goodness of Fit for Structural Model

Index	Acceptable	Statistical Values
CMIN/DF	< 5.00 (Al-Mamary & Shamsuddin, 2015; Awang, 2012)	1019.425/292 or 3.491
GFI	≥ 0.85 (Sica & Ghisi, 2007)	0.861
AGFI	≥ 0.80 (Sica & Ghisi, 2007)	0.833
NFI	≥ 0.80 (Wu & Wang, 2006)	0.852
CFI	≥ 0.80 (Bentler, 1990))	0.889
TLI	≥ 0.80 (Sharma et al., 2005)	0.877
RMSEA	< 0.08 (Pedroso et al., 2016)	0.071
Model Summary		**In harmony with Empirical data**

Remark: CMIN/DF = The ratio of the chi-square value to degree of freedom, GFI = Goodness-of-fit index, AGFI = Adjusted goodness-of-fit index,, NFI = Normed fit index, CFI = Comparative fit index, TLI = Tucker-Lewis index and RMSEA = Root mean square error of approximation.

4.4 Research Hypothesis Testing Result

The strength of the relationship between the independent and dependent variables stated in the hypothesis can be assessed by examining the regression coefficients or standardized path coefficients.

Table 7: Hypothesis Results of the Structural Equation Modeling

Hypothesis	(β)	t-Value	Result
H1: SYSQ→SATISF	0.115	2.388*	Supported
H2: IQ→SATISF	0.073	1.513	Not Supported
H3: SERQ→SATISF	0.113	2.222*	Supported
H4: CONF→SATISF	0.248	4.202*	Supported
H5: CONF→PU	0.420	7.706*	Supported
H6: PU→SATISF	0.130	2.355*	Supported
H7: SATISF→CI	0.294	5.401*	Supported

Note: * $p<0.05$
Source: Created by the author

Table 7 present the results of the hypotheses, where five out of the seven proposed hypotheses were supported. Students' satisfaction strongly influenced the intention to continue using the system. Additionally, system quality, confirmation, and perceived usefulness significantly influenced students' satisfaction.

In **H1,** the path relationship between system quality and students' satisfaction had a standardized path coefficient of 0.115 and a t-value of 2.388. **H2,** which examined the path relationship between information quality and students' satisfaction, had a standardized path coefficient of 0.073 and a t-value of 1.513.

H3 investigated the relationship between service quality and student satisfaction, with a standardized path coefficient of 0.113 and a t-value of 2.222.

In **H4,** the path relationship between confirmation and students' satisfaction had a standardized path coefficient of 0.248 and a t-value of 4.202.

Furthermore, **H5** explored the path relationship between confirmation and perceived usefulness, with a standardized path coefficient of 0.420 and a t-value of 7.706.

H6 examined the relationship between perceived usefulness and students' satisfaction, with a standardized path coefficient of 0.130 and a t-value of 2.355.

Lastly, **H7** investigated the relationship between students' satisfaction and the intention to continue using the system, with a standardized path coefficient of 0.294 and a t-value of 5.401.

5. Conclusion and Recommendation

5.1 Conclusion and Discussion

This study investigated the factors influencing postgraduate students' e-learning satisfaction, perceived usefulness, and continuance intention in Chengdu, China. Using a comprehensive conceptual framework and data analysis techniques such as Confirmatory Factor Analysis

(CFA) and Structural Equation Modeling (SEM), the study yielded important insights into the factors that impact postgraduate students' e-learning experience.

The findings of this research highlight several key factors that significantly influence postgraduate students' e-learning satisfaction, perceived usefulness, and continuance intention. System quality, confirmation, and perceived usefulness emerged as the most influential factors in determining postgraduate students' satisfaction and intention to continue using e-learning platforms. These findings align with prior research that emphasizes the importance of these factors in shaping users' attitudes and behaviors toward technology adoption.

The strong relationship observed between postgraduate students' e-learning satisfaction and their intention to continue using the system underscores the crucial role of satisfaction in promoting long-term engagement and adoption of e-learning platforms. This finding suggests that higher education institutions should prioritize enhancing the quality factors of their e-learning systems to ensure that postgraduate students perceive them as useful and valuable tools for their academic pursuits.

Furthermore, the study revealed that system quality and confirmation significantly contribute to postgraduate students' e-learning satisfaction. This implies that developers and administrators of e-learning platforms should focus on improving the technical aspects and features of the systems and providing clear and consistent information to users to enhance their overall satisfaction.

It is worth noting that perceived usefulness was also a significant factor in determining postgraduate students' e-learning satisfaction. This highlights the importance of ensuring that e-learning platforms are designed and implemented to meet the specific needs and expectations of postgraduate students. Institutions should strive to provide relevant and valuable content, interactive features, and user-friendly interfaces to maximize the perceived usefulness of these platforms.

In conclusion, this study sheds light on the factors influencing postgraduate students' e-learning satisfaction, perceived usefulness, and continuance intention in Chengdu, China. The findings emphasize the importance of system quality, confirmation, and perceived usefulness in shaping students' attitudes and intentions toward e-learning. The study underscores the need for higher education institutions to continuously improve the quality factors of their e-learning systems to enhance postgraduate students' satisfaction and promote their continued usage of these platforms. By doing so, institutions can effectively harness the potential of e-learning to provide a valuable and engaging educational experience for postgraduate students in Chengdu, China.

5.2 Recommendation

Based on the findings of this study regarding the factors influencing postgraduate students' e-learning satisfaction, perceived usefulness, and continuance intention in Chengdu, China, several recommendations can be made to enhance the overall e-learning experience for these students. Higher education institutions must prioritize improving system quality in their e-learning platforms. This includes ensuring the platforms are user-friendly, technologically robust, and provide seamless navigation and functionality. Regular updates and maintenance should be conducted to address any technical issues and enhance the overall user experience.

Institutions should pay attention to the confirmation aspect of e-learning platforms, which provide clear and consistent information to users. This can be achieved through effective communication channels, comprehensive instructions, and timely feedback. By improving the confirmation processes, postgraduate students will better understand the e-learning platforms and feel more confident in their use.

Institutions should strive to design and implement e-learning platforms that are highly relevant and valuable to postgraduate students. This can be achieved by offering a wide range of engaging and interactive content, incorporating real-world applications and case studies, and providing opportunities for collaboration and discussion. Institutions can increase student engagement and motivation by focusing on the perceived usefulness of e-learning.

It is essential to offer comprehensive training and support to postgraduate students using e-learning platforms. This can include orientation sessions, tutorials, and resources that guide students in navigating and utilizing the platforms effectively. Additionally, institutions should establish support channels, such as help desks or online forums, where students can seek assistance and address any concerns or difficulties.

Institutions should actively seek feedback from postgraduate students regarding their e-learning experience. This can be done through surveys, focus groups, or individual interviews. By collecting and analyzing this feedback, institutions can identify areas for improvement and implement necessary changes to enhance the e-learning platforms and meet the evolving needs of postgraduate students.

E-learning platforms should provide opportunities for collaboration and interaction among postgraduate students. This can be achieved through discussion forums, group projects, and virtual classrooms. By fostering a sense of community and promoting peer-to-peer learning, institutions can enhance postgraduate students' overall satisfaction and engagement.

5.3 Limitation and Further Study

One limitation of this study is its focus on a specific population of students at Chengdu University and the inclusion of only a few popular majors for quantitative analysis. Future explorations can be conducted in two main areas to address this limitation and further enhance the research.

Firstly, the scope of the research can be expanded to include other representative science and technology majors, such as mechanical or civil engineering, to capture a broader range of perspectives and experiences. Additionally, the investigation can be extended to encompass other universities in Sichuan Province or other regions of China. This allows a more comprehensive understanding of postgraduate students' e-learning satisfaction, perceived usefulness, and continuance intention.

Secondly, future research can consider incorporating additional latent variables into the study. These variables may include behavioral intention, social influence, self-efficacy, effort expectancy, trust, perceived interaction, learning motivation, performance expectancy, and facilitating conditions. By including these variables, the research framework on the conceptual structure of student satisfaction with e-learning can be expanded, providing a more comprehensive and nuanced understanding of the factors that influence postgraduate students' e-learning experiences.

By addressing these recommendations, future studies can overcome the limitations of this research and contribute to a more robust and comprehensive understanding of the factors influencing postgraduate students' e-learning satisfaction, perceived usefulness, and continuance intention. This will ultimately aid in developing more effective and tailored e-learning platforms and strategies to meet the diverse needs of postgraduate students in Chengdu, China, and beyond.

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