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Influencing Factors of Postgraduates' Online Learning Satisfaction: A Case Study of a Public University in Chongqing, China

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Abstract

With the rapid development of information technology, online teaching has become a tradition of country-wide education. The widespread use of online instruction in colleges and universities still needs to improve in terms of student satisfaction, especially in Chongqing, China. The influencing factors of student satisfaction have been discussed in this study, including self-efficacy, perceived usefulness, ease of use, information quality, system quality, and service quality. Questionnaire was distributed to 500 postgraduate students from Southwest University of Chongqing, China. The Item-Objective Congruence (IOC) and pilot test (n=50) of Cronbach's Alpha were validated before the data collection. Confirmatory factor analysis (CFA) and structural equation modeling (SEM) are the main statistical methods. Self-efficacy has a significant influence on perceived usefulness. Satisfaction is significantly influenced by perceived usefulness, perceived ease of use, information quality, service quality, and system quality. In conclusion, universities should organize regular seminars and workshops for lecturers on using mobile technology effectively to facilitate effective research and collaboration.

Keywords: online learning, information quality, service quality, system quality, satisfaction

Introduction

The online course is the comprehensive teaching content and activities implemented to express the teaching objectives of a particular subject (Wu & Wang, 2006). An online learning course is one in which most or all the content is conducted online, and there is usually no or little face-to-face teaching (Liu et al., 2020). Based on the above definition, this study shows that an online learning course is a planned learning and participation process for a particular subject based on Internet technology support and a new teacher-learning relationship. Based on this, this paper studies the benefits of online learning for college students. Before introducing the main concepts of this study, the researcher will discuss the history and policies of online learning development in China, as well as its current development status and problems. The research question is what are determinants of student satisfaction in the context of online learning in China? Therefore, this study aims to identify

the influencing factors of student satisfaction, including self-efficacy, perceived usefulness, ease of use, information quality, system quality, and service quality.

Literature Review

Self-Efficacy

Self-efficacy refers to the degree to which students think they can successfully learn from online learning courses (Shen et al., 2013). This variable is students' confidence in their ability to successfully perform specific behaviors to produce results or effectively perform learning tasks (Aldholay et al., 2018). Drawing on Bandura's self-efficacy theory (1977), computer self-efficacy is an essential topic of technology acceptance. Students' self-efficacy in e-learning can be defined as their ability to carry out learning activities with the help of e-learning systems or related technologies (Abbad, 2010). Self-efficacy is a personal trait that dramatically impacts the application of technology. It refers to students' belief that they can learn good things from online learning courses (Shen et al., 2013).

Some of them support, from the perspective of universities, a proposition about teacher development (Wolski & Jackson, 1999). It was posited that it affected the adoption and use of techniques (Padumadasa, 2012). In addition, there are four prerequisites for self-efficacy, the first being previously learned knowledge and skills. The second method is to demonstrate or select through observation of other successful practices. A person with high self-efficacy is more likely to approach challenging tasks with confidence and optimism, while someone with low self-efficacy may avoid such tasks altogether or give up quickly when faced with difficulties (Min et al., 2022). The fourth is the physiological condition, which is related to sadness. Yeo and Neal (2008) argued that self-efficacy influences an individual's choice of activities, their level of effort, and their persistence in the face of obstacles. Therefore, a hypothesis is proposed:

Hypothesis 1: Self-efficacy has a significant influence on perceived usefulness.

Perceived Ease of Use

According to Hu and Lai (2019), perceived ease of use refers to the user's perception of the ease of performing related activities when using the system, such as system operation, difficulty understanding learning content, and task completion efficiency. Perceived ease of use refers to how much people save energy using a unique system "(Davis, 1989). The literature also shows that perceived ease of use is related to accessibility. In short, perceived ease of use determines the difficulty and simplicity of students using learning and blog systems (Ifinedo, 2017). It is the extent to which a student supposes that the employment of the online education system is easy and effortless (Qin et al., 2019). Perceived ease of use is the extent to which a sample believes utilizing the services from the target system would be more efficient (Bashir & Madhavaiah, 2015).

Many studies have explored the impact of perceived ease of use on user attitudes toward using programs (Szajna, 1996). The research of Roca et al. (2006) and Yu et al. (2012) in the context of e-learning shows that perceived ease of use is an essential determinant of user satisfaction. In other studies, Islam et al. (2011) and Glerum (2007) also found that perceived ease of use is a powerful predictor of wireless service satisfaction and Satisfaction. Ease of use

influenced students' adoption of blogs and judgments of system usefulness. Perceived usefulness and perceived ease of use have a good relationship (Ifinedo, 2017). In the field of library research, Ortiz et al. (2006) found that the usability of online public access directory (OPAC) is related to satisfaction. Based on the above analysis. The use of perceptibility will bring positive effects to satisfaction. Hence, the researcher put forward a hypothesis:

Hypothesis 2: Perceived ease of use has a significant influence on satisfaction.

Perceived Usefulness

Perceived usefulness refers to the extent to which people hope to gain operational or strategic advantage through information systems (Bhattacherjee, 2001). It has a significant impact on user satisfaction. The technology acceptance model shows that perceived usefulness refers to people's attitudes toward systems and technologies (Davis, 1989). It was defined in the technology acceptance model as an individual who regards implementing innovation as an improvement. Perceived usefulness points out that using a specific system in the personal opinion can improve work performance (Davis, 1989). Mathwick et al. (2001) determined perceived usefulness quite similar to Davis (1989), which is the degree to which an individual considers a particular system to improve their role quality. According to Masrek and Gaskin (2016) 's research, perceived usefulness is the belief that users can use the computer system to enhance their academic achievement or improve their academic achievement through the knowledge provided by the computer system.

When implementing ISSM's net income, many researchers will use the items to survey perceived Usefulness (Masrek & Gaskin, 2016). Many surveys show users' acceptance of distributed accounting systems depends mainly on perceived effectiveness (Hong et al., 2001). However, a study shows that perceived usefulness is a significant predictor (Lwoga, 2013; Roca et al., 2006). Experiencing the advantages and practicality of digital libraries will satisfy users (Fraser & Gluck, 1999). On the contrary, when the University of Technology downloaded experience, which showed that digital library had no benefit, their Satisfaction would be reduced. Based on previous studies, a hypothesis is indicated:

Hypothesis 3: Perceived usefulness has a significant influence on satisfaction.

Information Quality

Information quality is "the scope of application of the information provided" (Larry, 2009). Information quality mainly includes the accuracy, completeness, universality, efficiency, relevance, scope, and timeliness of the materials and forms provided by the information system (Cheng, 2014). Information quality is crucial for measuring information system output's accuracy, integrity, and format (Nelson et al., 2005). Participants believed that when using the system, the information heard by the system should be valuable, complete, efficient, and timely. In other words, information quality is related to the value of information users provide in online learning systems (Aldholay et al., 2018). Researchers identified that information systems could be measured by relevance, accuracy, and timeliness dimensions (Van Birgelen et al., 2008).

The two researchers believe that online quality factors such as service quality, system quality, and information quality are crucial, and these factors are the key factors in judging the outstanding information system (DeLone & McLean, 2003). Information systems have

been developed, providing agencies with opportunities to improve services and capabilities, improve efficiency and accountability systems and simplify the daily work of their representatives (Laukkanen, 2016). This paper validated the model from the perspectives of structure, information quality, and user satisfaction (Bharatia & Chaudhury, 2004). Information quality directly affected the accuracy and relevance of user information and positively impacted user satisfaction (Petter et al., 2008). Thus, this study hypothesizes that:

Hypothesis 4: Information quality has a significant influence on satisfaction.

System Quality

The quality of the system is reflected by the quality process composed of software and data. This is a method of measuring the technical integrity of the system. System quality refers to the advanced platform level provided by the system for users (Wang et al., 2014) in conjunction with his success model. Chang (2013) mentioned that system quality is the second independent construct in the model and is a recommended variable for studying management information systems, for example, system performance, trustworthiness, on-time response, and online. Eom (2012) proposed a similar definition of system quality, believing it is one factor that reflects the usefulness, effectiveness, and dependability of users' access to the system and can increase their learning and job productivity. According to Lederer et al. (2000) 's research, system quality was a robust forecasted factor of perceived usefulness.

DeLone and McLean (1992) showed that system quality greatly concerns the technological standard of the system. Yuce et al. (2019) showed that system quality is the critical factor affecting the user's actual user experience and the system's effectiveness and efficiency. Similarly, the quality of the system has a significant impact on user satisfaction and performance. A system with high-quality features and performance is more likely to lead to higher user satisfaction, while a system with poor quality may result in frustration, dissatisfaction, and even abandonment of the technology altogether (Balog, 2011; Masrek & Gaskin, 2016; Vinagre & Muñoz, 2011). Chang (2013) stated that service, information, and system quality were the key factors affecting students' behavior in the e-learning environment. Accordingly, a hypothesis is developed:

Hypothesis 5: System quality has a significant influence on satisfaction.

Service Quality

The definition of service quality and website is to improve customers' shopping efficiency and efficiency, improve the quality of goods and services, and explain the role of these websites in enhancing customer service quality (Chang, 2013). According to the research of Roca et al. (2006), service quality is a helpful predictor of e-learning acceptance. Reliability, relevance, sympathy, and other indicators show that the service quality users feel when using mainly refers to the degree of support students can provide (Aldholay et al., 2018). According to Wang et al. (2014), service quality refers to the support provided by the system creator in computer teaching and reflects service efficiency. Service quality is the digital library users' perception regarding information retrieval and transmission (Balog, 2011). Min et al. (2022) considered that service quality refers to the comprehensive measurement of customers' service quality in the virtual market. According to Chang (2013), service quality is an essential factor that affects consumers' cognitive value and Satisfaction

and also improves the possibility of users' reuse in practical applications. Service quality included reliability, supportability, interactivity, and responsiveness.

Researchers can confirm its applicability in the field of education. From this perspective, it introduced eight aspects that users use to evaluate the quality of electronic products and web pages (Chang, 2013). It pointed out that improving user satisfaction and experience enhances the quality of users' use of the system so that users can feel the reliability of usefulness, timeliness of response, smooth communication, and convenience of use (Wang et al., 2014). Good teaching service quality can significantly improve students' learning satisfaction and academic performance (Yuce et al., 2019). Moreover, the researcher pointed out that service quality significantly affects perceived value and user satisfaction (Tam, 2000). Subsequently, a hypothesis is suggested:

Hypothesis 6: Service quality has a significant influence on satisfaction.

Satisfaction

User satisfaction is a kind of empathy that can help users gain more knowledge and improve efficiency, skills, and productivity by measuring the success of testing products. The success of products depends on personal differences (Yuce et al., 2019). User satisfaction refers to Internet users' contentment with their decision to use the Internet and the extent to which their expectations are met (Isaac & Abdullah, 2017). The definition of user satisfaction is that users are satisfied with the speed, quality, number of functions, and system design (Wang & Lin, 2012). An individual's evaluation of an emotional response to the overall experience of a service or product is the definition of Satisfaction in using an e-learning system (Masrek & Gaskin, 2016). Sharma et al. (2014) found that Satisfaction is a psychological acceptance mechanism for the credibility, quality, and reliability of the content provided by learning websites.

Artino (2009) found that in the learning process, motivation variables, such as self-efficacy and task value, have a positive predictive effect on course satisfaction, while boredom and failure to achieve expectations will negatively impact course satisfaction. Through the investigation of online learning, the results show that college students' online self-efficacy, self-regulated learning, teacher-student interaction, teacher-student interaction, student content interaction, and so on are related to their Satisfaction. Much research has been done to measure student satisfaction at universities in developed countries. Many factors affect student satisfaction with the school's educational services-informal student-faculty contact related to withdrawal or retention decisions (Min et al., 2022).

Research Methodology

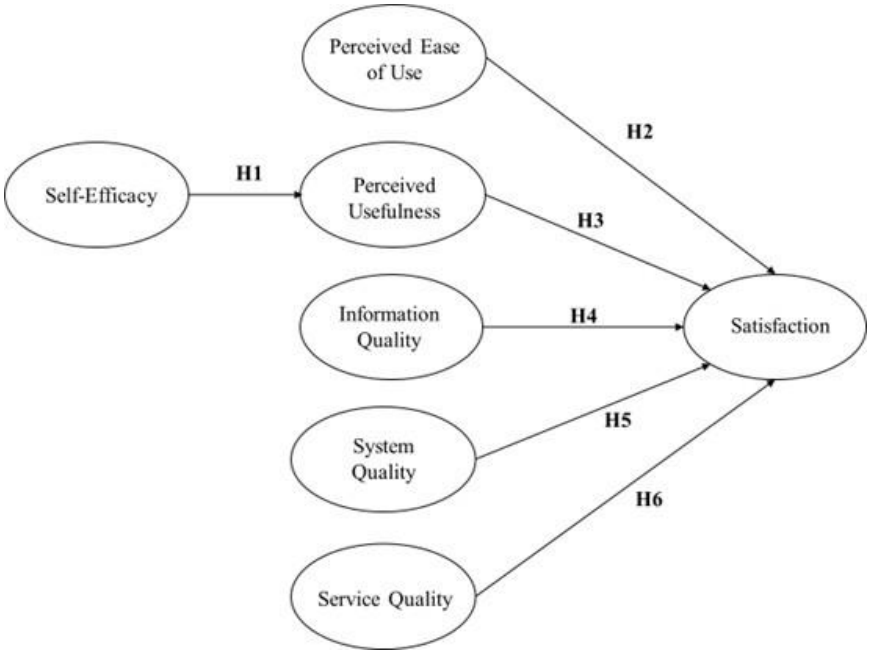
Conceptual Framework

The researcher presented the modified conceptual framework and analysis of online learning and the Satisfaction of college students in Chongqing. To construct the conceptual framework, existing scientific research approaches were examined. Chang (2013) identified a correlation between system quality, service quality, information quality, and satisfaction. Besides, Masrek and Gaskin (2016) demonstrated how interconnected perceived usefulness,

ease of use, and satisfaction are. In addition, Qin et al. (2019) also established that self-efficacy and perceived usefulness are associated. The conceptual framework was constructed based on these constructs, as shown in Figure 1.

Figure 1

Conceptual Framework



Note: Constructed by author

Research Design

The questionnaire comprised three key elements: screening question, demographic information, and the factors related to the conceptual framework's seven variables. Before the data collection process, The Item-Objective Congruence (IOC) and pilot test of Cronbach's Alpha were applied to validate the validity and reliability of all scale items of variables. As a result, all scale items approved by three experts at a score equal to or above 0.6. Cronbach's alpha coefficient reliability test was used to examine a pilot test (n=50). Consequently, all constructs show internal consistency with above 0.7 (George & Mallery, 2003). Confirmatory factor analysis (CFA) and structural equation modeling (SEM) are the main statistical methods.

Research Population and Sample

In quantitative research, although the target group is composed of different participants, the intention or purpose of these groups to obtain and explain information has the same characteristics (Johnson & Christensen, 2019). The target group of this empirical study is all graduate students majoring in art design, physical, history and culture, and English at the Southwest University of China.

Judgmental sampling is to select the specific group of graduate students, majoring in art design, physical, historical culture, and English at Southwest University of Chongqing,

China. For quota sampling, the total of 1,000 students are in history and culture of 278, English of 321, Physical of 161 and Art Design of 240. The proportionate sample size is calculated to be 139, 161, 80 and 120 accordingly. Convenience sampling is to distribute questionnaire to the target group. After collecting 500 responses, the researchers spent three weeks inputting the data into Microsoft Excel files for quantitative statistical analysis.

Data Analysis

The researchers also conducted confirmatory factor analysis (CFA) to evaluate the factor loading, t-value, composite reliability (CR), average variance extracted (AVE), and discriminant validity. The structural equation model (SEM) was subsequently employed to investigate the outcomes of the hypotheses and the direct, indirect, and overall effects of the correlations between the latent variables. In addition, to determine the appropriate sample size, sampling techniques are used as the sampling process, including judgmental, quota and convenience.

Demographics of Participants

Table 1 summarizes the comprehensive demographic characteristics of 500 respondents. Male students accounted for 49.2% of all participants, while female students accounted for 50.8%. 29% of students majored in history and culture, 20% majored in physical, 25% majored in art design, and 26% majored in English. According to the academic year of the participants, 32% are first-year students, 22% are sophomores, 25% are juniors, and 21% are seniors.

Table 1

The demographic data

Demographic and General Data (n=500)	Category	Frequency	Percentage
Gender	Male	246	49.2%
	Female	254	50.8%
Major Belong	History and Culture	145	29%
	English	130	26%
	Physical	100	20%
	Art Design	125	25%
Academic Year	Freshman	160	32%
	Sophomore	112	22%
	Junior	120	25%
	Senior	108	21%

Results and Discussion

Masrek and Gaskin (2016) emphasized that confirmatory factor analysis (CFA) can be used to evaluate structural equation models and the degree of convergence and differentiation. Table 2 demonstrates that all constructs show internal consistency with above 0.7 (George & Mallery, 2003), the absolute values of the average extracted variance (AVE) were more

significant than 0.50, the composite reliability (CR) was beyond 0.70, and the factor loading values were all over 0.50 (Bagozzi & Yi, 1988; Hair et al., 2014).

Table 2

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

Variables	Source of Questionnaire	No. of Item	CA	Factors Loading	CR	AVE
Perceived Ease of Use (PEOU)	Davis (1989)	4	0.895	0.625-0.867	0.859	0.609
Perceived Usefulness (PU)	Davis (1989)	5	0.901	0.537-0.888	0.868	0.576
Self – Efficacy (SE)	Bandura (1986)	3	0.772	0.748-0.883	0.875	0.702
Information Quality (IQ)	Aldholay et al. (2020)	4	0.815	0.705-0.828	0.865	0.618
System Quality (SYQ)	DeLone and McLean (2003)	4	0.741	0.651-0.908	0.879	0.597
Service Quality (SQ)	Yuce et al. (2019)	5	0.740	0.742-0.898	0.887	0.726
Satisfaction (SAT)	Aldholay et al. (2018)	5	0.894	0.698-0.810	0.876	0.585

The consequences of the investigation into and presentation of the discriminant validity are demonstrated in Table 3. The diagonally designated quantity is the AVE square root of the AVE, and neither of the correlations crossing any two latent variables was more considerable than 0.80.

Table 3

Square roots of AVEs and correlation matrix

	PEOU	PU	SE	IQ	SYQ	SEQ	SAT
PEOU	**0.780**						
PU	0.172	**0.759**					
SE	0.127	0.284	**0.838**				
IQ	0.146	0.081	0.014	**0.786**			
SYQ	0.185	0.138	0.120	0.126	**0.817**		
SEQ	0.179	0.173	0.136	0.130	0.197	**0.773**	
SAT	0.423	0.288	0.110	0.206	0.388	0.241	**0.765d**

Note: The diagonally listed value is the AVE square roots of the variable

Additionally, as presented in Table 4, all the applicable thresholds for the absolute fit indicators, such as CMIN/DF, GFI, AGFI, and RMSEA, as well as the incremental fit measurements as CFI, NFI, and TLI, match the requirements. Consequently, all these measurements for the goodness of fits employed in the CFA examination were acceptable.

Table 4

Goodness of Fit for Measurement Model

Fit Index	Acceptable Criteria	Statistical Values Before Adjustment	Statistical Values After Adjustment
CMIN/DF	<3.00 (Hair et al., 2010)	2.586	2.043
GFI	> 0.90 (Bagozzi & Yi, 1988)	0.880	0.906
AGFI	> 0.80 (Filippini et al., 1998)	0.853	0.884
RMSEA	< 0.05 (Hair et al., 2006)	0.057	0.046
CFI	> 0.90 (Hair et al., 2006)	0.929	0.954
NFI	> 0.90 (Browne & Cudeck, 1993)	0.890	0.914
TLI	> 0.90 (Hair et al., 2006)	0.919	0.947
Model Summary		**Not in harmony with empirical data**	**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, RMSEA = Root mean square error of approximation, CFI = Comparative fit index, NFI = Normed fit index and TLI = Tucker–Lewis index.

Structural Equation Modeling (SEM)

According to data from various publications, the structural equation model consists of two parts (Byrne, 2016). A structural equation model (SEM) pointed out that the results had accurately explained or reconstructed the regression equations of observed variables in some research fields with direct and indirect effects (Wright, 1920). Table 5 demonstrates that when adjusted by AMOS, the combined values of CMIN/DF, GFI, AGFI, CFI, NFI, TLI, and RMSEA were all above acceptable limitations. As the outcome reveals, the goodness of fit of the SEM was established.

Table 5

Goodness of Fit for Structural Model

Fit Index	Acceptable Criteria	Statistical Values Before Adjustment	Statistical Values After Adjustment
CMIN/DF	<3.00 (Hair et al., 2010)	1536.172/427 or 3.598	1193.914/420 or 2.843
GFI	> 0.90 (Bagozzi & Yi, 1988)	0.817	0.854
AGFI	> 0.80 (Filippini et al., 1998)	0.787	0.827
RMSEA	< 0.05 (Browne & Cudeck, 1993)	0.072	0.061
CFI	> 0.90 (Hair et al., 2006)	0.881	0.917
NFI	> 0.90 (Hair et al., 2006)	0.843	0.878
TLI	> 0.90 (Hair et al., 2006)	0.870	0.908
Model Summary		**Not in harmony with empirical data**	**In harmony with empirical data**

Hypothesis Outcomes

According to the outcomes shown in Table 6, perceived ease of use exhibited a direct, significant effect on satisfaction, resulting in the most substantial impact in this quantitative approach, a standardized path coefficient (β) of 0.356 (t-value =7.588***). System quality provides the second-powerful considerable interaction effect on Satisfaction with β at 0.298 (t- a value of 6.788***). Additionally, perceived usefulness significantly influenced Satisfaction with the β at 0.230 (t-value at 4.882***), while service quality markedly

impacted Satisfaction with the β at 0.105 (t-value at 2.499***). Moreover, information quality was also examined and determined to substantially move satisfaction with the β of 0.120 (t-value of 3.025**). Consequently, perceived usefulness exhibited the least significant influence on satisfaction in this quantifiable investigation, with 0.221 (t-value at 5.520***).

Table 6

Summary of hypothesis tests

Hypothesis	Standardized path coefficient (β)	t-value	Testing result
H1: Self-efficacy has a significant impact on perceived usefulness.	0.221	5.520***	Supported
H2: Perceived ease of use has a significant impact on satisfaction.	0.356	7.588***	Supported
H3: Perceived usefulness has a significant impact on satisfaction.	0.230	4.882***	Supported
H4: Information quality has a significant impact on satisfaction.	0.120	3.025**	Supported
H5: System quality has a significant impact on satisfaction.	0.298	6.788***	Supported
H6: Service quality has a significant impact on satisfaction.	0.105	2.499*	Supported

Note: *** p<0.001, ** p<0.01, * p<0.05

Discussion

According to the findings in Table 6, this structural method's standardized path parameter threshold is 0.221, and H1 indicates that perceived usefulness is an essential determinant of self-efficacy. Some researchers have proposed that self-efficacy is a significant predictor of search performance in online learning, and major groups are more confident in completing online education, indicating that learners' self-efficacy positively impacts perceived usefulness. (Hamden et al., 2021; Joo et al., 2000; Marakas et al., 1998)

In H2, the analysis demonstrated that one of the primary characteristics of Satisfaction is perceived ease of use, with a standardized path coefficient of 0.356. Masrek and Gaskin (2016) and Cheng (2020) also suggested that there are subjective cognitive differences in information systems, and perceived ease of use is an essential factor determining whether users adopt information systems and affect Satisfaction.

The observable statistic findings for H3 confirmed the hypothesis that perceived usefulness had a significant consequence on Satisfaction, with the common coefficient value of 0.230 indicating the most effective necessary development in this quantification investigation. Many scholars also consider that for users to be satisfied, they must first recognize the role of perceived Usefulness (Mouakket & Bettayeb, 2015). Perceived usefulness is the main reason affecting secondary students' Satisfaction with online MBA programs (Arbaugh, 2005).

Additionally, H4 demonstrated that information quality significantly impacted Satisfaction, with a common coefficient value of 0.120. The information system is a crucial subject in the management information system field. Some researchers took the performance method of information systems as an essential dependency factor in evaluating the institute's information system (DeLone & McLean, 1992). Information quality is a significant factor in Satisfaction and has an enormous impact on Satisfaction (Ainur et al., 2017).

Moreover, H5 confirmed that system quality significantly impacted Satisfaction in this investigation, with a common coefficient value of 0.298 Yuce et al. (2019) also pointed out that the system quality plays a significant role in the final impression of users and evaluators that with the improvement of the quality of online teaching, the online teaching system quality can better meet the needs of learners and complete teaching tasks more effectively, to improve users' Satisfaction with learning.

Regarding H6, it was observed that service quality had a significant relationship with Satisfaction, resulting in an expected coefficient value of 0.105, the weakest effect points in this academic research. Therefore, researchers demonstrated that with the improvement of the service quality of online teaching, the online teaching system could better meet the needs of learners and complete teaching tasks more effectively, to improve users' Satisfaction with learning (Bailey & Pearson, 1983). Yuce et al. (2019) also demonstrated that service quality plays a significant role in the final impression of users' and evaluators' satisfaction.

Conclusion and Recommendations

Conclusion

This study aims to determine which factors significantly impact the Satisfaction of postgraduate students in four different majors of Chongqing Southwest University in China with online education. The conceptual framework shows six assumptions to verify the interaction between perceived ease of use, perceived usefulness, service quality, system quality, information quality, self-efficacy, and Satisfaction. 500 postgraduates with online education experience participated in the questionnaire survey to determine the interaction between these variables. According to the results of this study, self-efficacy has a significant influence on perceived usefulness. Satisfaction is significantly influenced by perceived usefulness, perceived ease of use, information quality, service quality, and system quality.

Recommendations

Based on the findings of the study investigating the satisfaction of postgraduate students at Chongqing Southwest University with online education, the following recommendations can be made. Since self-efficacy significantly influences perceived usefulness, it is essential to focus on strategies that boost students' confidence in their ability to effectively use online education platforms. Providing training, resources, and support to develop technical skills and familiarity with online learning tools can help improve self-efficacy.

Perceived usefulness emerged as a significant factor influencing satisfaction. Therefore, efforts should be made to demonstrate and communicate the benefits and advantages of online education to postgraduate students. Highlighting how online education enhances flexibility, access to resources, and interactive learning experiences can enhance students' perception of

usefulness and, in turn, their satisfaction.

Perceived ease of use is another factor that significantly influences satisfaction. Universities should invest in user-friendly online platforms and technologies that are intuitive and require minimal effort to navigate. Offering clear instructions, providing technical support, and conducting orientation sessions can also contribute to enhancing students' ease of use and overall satisfaction.

Information quality plays a significant role in determining students' satisfaction with online education. It is crucial to ensure that the information provided through online platforms is accurate, up-to-date, relevant, and easily accessible. Regularly reviewing and updating course materials, providing additional resources, and promoting interactive communication channels can enhance the quality of information and, consequently, student satisfaction.

Students' satisfaction is influenced by the quality of services and systems provided in the online education environment. Universities should prioritize improving technical infrastructure, ensuring reliable connectivity, and addressing any system glitches or issues promptly. Additionally, offering timely and responsive support services, such as online helpdesks, discussion forums, and personalized assistance, can contribute to a positive student experience and higher satisfaction levels.

Limitations and Further Study

For the actual situation of this survey, the limitation includes time: the duration of quantitative research is about one year. In addition, the population and sample are limited to four different majors of Southwest University of Chongqing, China, and the conceptual framework contains only six potential variables. Therefore, the view is about further exploration: expand the scope of research to other regions of China or Asian countries. In addition, other technology acceptance theories, such as the theory of reasonable action (TRA), the theory of planned behavior (TPB), and the information system success model (ISSM), should be explored to develop the conceptual framework.

References

Abbad, M. (2010). Learning from Group Interviews: Exploring Dimensions of Learning Management System Acceptance. *International Journal of Instructional Technology and Distance Learning, 7*(3), 25-39.

Ainur, A. K., Deni, S. M., Jannoo, Z., & Yap, B. W. (2017). Sample Size and Non-Normality Effects on Goodness of Fit Measures in Structural Equation Models. *Pertanika Journal of Science and Technology, 25*(2), 575-586.

Aldholay, A., Abdullah, Z., Isaac, O., & Mutahar, A. M. (2020). The Perspective of Yemeni Students on the Use of Online Learning Extending the Information Systems Success Model with Transformational Leadership and Compatibility. *Information Technology & People, 33*(1), 106-128.

Aldholay, A., Isaac, O., & Abdullah, Z. (2018). An extension of DeLone and McLean IS success model with self-efficacy Online learning usage in Yemen. *The International Journal of Information and Learning Technology, 35*(4), 285-304. https://doi.org/10.1108/ijilt-11-2017-0116

Arbaugh, J. B. (2005). Is There an Optimal Design for Online MBA Courses?. *Academy of Management Learning and Education, 4*(2), 135-149. https://doi.org/10.5465/amle.2005.17268561

Artino, A. R. (2009). Online learning: Are subjective perceptions of instructional context related to academic success?. *Internet and Higher Education, 12*(3-4), 117-125. https://doi.org/10.1016/j.iheduc.2009.07.003.

Bagozzi, R., & Yi, Y. (1988). On the Evaluation of Structural Equation Models. *Journal of the Academy of Marketing Science, 16*(1), 74-94. https://doi.org/10.1007/BF02723327

Bailey, J. E., & Pearson, S. W. (1983). Development of a Tool for Measuring and Analyzing Computer User Satisfaction. *Management Science, 29*(5), 530-545. https://doi.org/10.1287/mnsc.29.5.530

Balog, A. (2011). Testing a multidimensional and hierarchical quality assessment model for digital libraries. *Studies in Informatics and Control, 20*(3), 233-246. https://doi.org/10.24846/v20i3y201104

Bandura, A. (1977). Self-efficacy: toward a unifying theory of behavioral change. *Advances in Behaviour Research & Therapy, 1*(4), 139-161. https://doi.org/10.1016/0146-6402(78)90002-4

Bandura, A. (1986). Social foundations of thought and action: a social cognitive theory. *Journal of Applied Psychology, 12*(1), 169. https://doi.org/10.4135/9781446221129.n6

Bashir, I., & Madhavaiah, C. (2015). Consumer Attitude and Behavioural Intention towards Internet Banking Adoption in India. *Journal of Indian Business Research, 7*, 67-102. https://doi.org/10.1108/JIBR-02-2014-0013

Bharatia, P., & Chaudhury, A. (2004). An empirical investigation of decision-making satisfaction in web-based decision support systems. *Decision Support Systems, 37*(2), 187-97. https://doi.org/10.1016/s0167-9236(03)00006-x

Bhattacherjee, A. (2001). Understanding information systems continuance: an expectation-confirmation model. *MIS Quarterly, 25*(3), 351-370. https://doi.org/10.2307/3250921

Browne, M. W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In K. A. Bollen and J. S. Long (Eds.), *Testing structural equation models* (pp. 136-162). Sage.

Byrne, B. M. (2016). *Structural equation modeling with AMOS: Basic concepts, applications, and programming* (3rd ed.). Routledge. https://doi.org/10.4324/9781410600219

Chang, C. C. (2013). Exploring the Determinants of E-learning Systems Continuance Intention in Academic Libraries. *Library Management, 34*(1/2), 40-55. https://doi.org/10.1108/01435121311298261

Cheng, Y.-M. (2014). Extending the Expectation Confirmation Model with Quality and Flow to Explore Nurses' Continued Blended E-learning Intention. *Information Technology & People, 27*(3), 230-258. https://doi.org/10.1108/itp-01-2013-0024

Cheng, Y.-M. (2020). Understanding cloud ERP continuance intention and individual performance: a TTF-driven perspective. *Benchmarking: An International Journal, 27*(4), 1591-1614. https://doi.org/10.1108/bij-05-2019-0208

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *Mis Quarterly, 13*(3), 319-340. https://doi.org/10.2307/249008

DeLone, W. H., & McLean, E. R. (1992). Information systems success: the quest for the dependent variable. *Information Systems Research, 3*(1), 60-95.

DeLone, W. H., & McLean, E. R. (2003). The Delone and Mclean model of information systems success: a ten-year update. *Journal of Management Information Systems/Spring, 19*(4), 9-30, available at: https://doi.org/10.1073/pnas.0914199107

Eom, S. B. (2012). Effects of LMS, self-efficacy, and self-regulated learning on LMS effectiveness in business education. *Journal of International Education in Business, 5*(2), 129-144. https://doi.org/10.1108/18363261211281744

Filippini, R., Forza, C., & Vinelli, A. (1998). Trade-off and Compatibility Between Performance: Definitions and Empirical Evidence. *International Journal of Production Research, 36*(12), 3379-3406. https://doi.org/10.1080/002075498192111

Fraser, B., & Gluck, M. (1999). Usability of geospatial metadata or space-time matters. *Bulletin of the American Society for Information Science, 25*(6), 24-28.

George, D., & Mallery, P. (2003). *SPSS for Windows step by step: A simple guide and reference 11.0 update* (4th ed.). Allyn & Bacon.

Glerum, J. O. (2007). *Stage Rigging Handbook* (3rd ed.). Southern Illinois University Press.

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate data analysis* (7th ed.). Prentice-Hall.

Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2006). *Multivariant data analysis* (6th ed.). Pearson.

Hair, J. F., Hult, G. T. M., Ringle, C., & Sarstedt, M. (2014). *A primer on partial least squares structural equation modeling.* SAGE Publishing.

Hamden, K., Al-Bashaireh, A. M., Zahran, Z., & Al-Daghestani, A. (2021). University students' interaction, Internet self-efficacy, self-regulation, and satisfaction with online education during pandemic crises of COVID-19 (SARS-CoV-2). *International Journal of Educational Management, 35*(3), 713-725. https://doi.org/10.1108/IJEM-11-2020-0513.

Hong, W., Thong, J. Y. L., Wong, W.-M., & Tam, K. Y. (2001). Determinants of User Acceptance of Digital Libraries: An Empirical Examination of Individual Differences and System Characteristics. *Journal of Management Information Systems, 18*(3), 97-124.

Hu, X., & Lai, C. (2019). Comparing factors that influence learning management systems use on computers and on mobile. *Information and Learning Science, 120*(7-8), 468-488. https://doi.org/10.1108/ILS-12-2018-0127

Ifinedo, P. (2017). Students' Perceived Impact of Learning and Satisfaction with Blogs. *The International Journal of Information and Learning Technology, 34*(4), 322-337. https://doi.org/10.1108/ijilt-12-2016-0059

Isaac, O., & Abdullah, Z. (2017). Internet usage, user satisfaction, task-technology fit, and performance impact among public sector employees in Yemen. *The International Journal of Information and Learning Technology, 34*(3), 210-241. https://doi.org/10.1108/ijilt-11-2016-0051

Islam, Z. M., Hasan, I., Ahmed, S. U., & Ahmed, S. M. (2011). Organizational culture and knowledge sharing: empirical evidence from service organizations. *African Journal of Business Management, 5*(14), 5900-5909. https://ssrn.com/abstract=1989270

Johnson, B., & Christensen, L. (2019). *Educational Research: Quantitative, Qualitative, and Mixed Approaches* (7th ed.). SAGE Publications Inc press.

Joo, Y. J., Bong, M., & Choi, H. J. (2000). Self-efficacy for self-regulated learning, academic self-efficacy, and Internet self-efficacy in web-based instruction. *Educational Technology Research and Development, 48*(2), 5-17.

Larry, P. (2009). *Information Quality Applied: Best Practices for Improving Business Information, Processes, and Systems* (1st ed.). Wiley Publishing.

Laukkanen, T. (2016). Consumer adoption versus rejection decisions in seemingly similar service innovations: The Internet and mobile banking case. *Journal of Business Research, 69*(7), 2432-2439. https://doi.org/10.1016/j.jbusres.2016.01.013

Lederer, A. L., Maupin, D. J., Sena, M. P., & Zhuang, Y. (2000). Technology acceptance model and the world wide web. Decision Support Systems, 29(3), 269-282. https://doi.org/10.1016/S0167-9236(00)00076-2

Liu, J., Li, Q., & Wang, J. (2020). Influencing Factors of Online Office APP Users' Intention Based on UTAUT. *Information Science, 38*(9), 49-68.

Lwoga, E. T. (2013). Measuring the success of library 2.0 technologies in the African context: The suitability of the DeLone and Mclean's model. *Campus-Wide Information Systems, 30*(4), 288-307.

Marakas, G. M., Yi, M. Y., & Johnson, R. D. (1998). The multilevel and multifaceted character of computer self-efficacy: Toward clarification of the construct and an integrative framework for research. *Information System Research, 9*(2), 126-163.

Masrek, M. N., & Gaskin, J. E. (2016). Assessing User's Satisfaction with Web Digital Library: The Case of Universiti Teknologi MARA. *The International Journal of Information and Learning Technology, 33*(1), 36-56. https://doi.org/10.1108/ijilt-06-2015-0019

Mathwick, C., Malhotra, N., & Rigdon, E. (2001). Experiential value: conceptualization, measurement, and application in the catalog and Internet shopping environment. *Journal of Retailing, 77*(1), 39-56. https://doi.org/10.1016/S0022-4359(00)00045-2

Min, Y., Huang, J., Varghese, M. M., & Jaruwanakul, T. (2022). Analysis of Factors Affecting Art Major Students' Behavioral Intention of Online Education in Public Universities in Chengdu. *AU-GSB E-JOURNAL, 15*(2), 150-158. https://doi.org/10.14456/augsbejr.2022.80

Mouakket, S., & Bettayeb, A. M. (2015). Investigating the Factors Influencing Continuance Usage Intention of Learning Management Systems by University Instructors the Blackboard System Case. *International Journal of Web Information Systems, 11*(4), 491-509. https://doi.org/10.1108/ijwis-03-2015-0008

Nelson, R. R., Todd, P. A., & Wixom, B. H. (2005). Antecedents of information and system quality: An empirical examination within the context of data warehousing. *Journal of Management Information Systems, 21*(4), 199-235. https://doi.org/10.1080/07421222.2005.11045823

Ortiz, J., Romero, N., Robert, P., & Araya, J. (2006). Dietary fiber, amino acid, fatty acid and tocopherol contents of the edible seaweeds Ulva lactuca and Durvillaea antarctica. *Food Chemistry, 99*(1), 1-10.

Padumadasa, E. (2012). E-learnification of Sri Lanka higher education sector: Adoption perspective. *Proceedings of the UK Academy for Information Systems Conference 2012, 42*, 1-32. https://aisel.aisnet.org/ukais2012/42

Petter, S., DeLone, W., & McLean, E. (2008). Measuring information systems success: Models, dimensions, measures, and interrelationships. *European Journal of Information Systems, 17*(3), 236-263. https://doi.org/10.1057/ejis.2008.15

Qin, C., Liu, Y., Mou, J., & Chen, J. (2019). User adoption of a hybrid social tagging approach in an online knowledge community. *Aslib Journal of Information Management, 71*(2), 155-175. https://doi.org/10.1108/AJIM-09-2018-0212

Roca, J. C., Chiu, C. M., & López, F. J. M. (2006). Understanding e-Learning continuance intention: An extension of the technology acceptance model. *International Journal of Human-Computer Studies, 64*(8), 683-696. https://doi.org/10.1016/j.ijhcs.2006.01.003

Sharma, S. K., Chandel, J. K., & Govindaluri, S. M. (2014). Students' acceptance and satisfaction of learning through course websites. *Education, Business and Society Contemporary Middle Eastern Issues, 7*(2/3), 152-166.

Shen, D., Cho, M. H., Tsai, C. L., & Marra, R. (2013). Unpacking online learning experiences: online learning self-efficacy and learning satisfaction. *Internet and Higher Education, 19*(1), 10-17. https://doi.org/10.1016/j.iheduc.2013.04.001

Szajna, B. (1996). Empirical evaluation of the revised Technology Acceptance Model?. *Manage-ment Science, 42*(1), 85-92.

Tam, J. L. M. (2000). The effects of service quality, perceived value, and customer satisfaction on behavioral intentions. *Journal of Hospitality and Leisure, 6*(4), 31-43.

Van Birgelen, M. J. H., Wetzels, M., & VanDolen, W. M. (2008). Effectiveness of corporate employment websites: How content and form influence intentions to apply. *International Journal of Manpower, 29*(8), 731-751.

Vinagre, M., & Muñoz, B. (2011). Computer-mediated corrective feedback and language accuracy in telecollaborative exchanges. *Language Learning & Technology, 15*(1), 72-103. http://dx.doi.org/10125/44238

Wang, K., & Lin, C. L. (2012). The adoption of mobile value-added services: Investigating the influence of I.S. quality and perceived playfulness. *Managing Service Quality, 22*(2), 184-208. https://doi.org/10.1108/09604521211219007

Wang, Y. S., Li, H. T., Li, C. R., & Wang, C. (2014). A Model for Assessing Blog-based Learning Systems Success. *Online Information Review, 38*(7), 969-990. https://doi.org/10.1108/oir-04-2014-0097

Wolski, S., & Jackson, S. (1999). Technological Diffusion within Educational Institutions: Applying the Technology Acceptance Model. *Proceedings of SITE 1999-Society for Information Technology & Teacher Education International Conference*, 1718-1723.

Wright, S. (1920). The Relative Importance of Heredity and Environment in Determining the Piebald Pattern of Guinea-Pigs. *Proceedings of the National Academy of Sciences, 6*(6), 320-332. http://doi.org/10.1073/pnas.6.6.320

Wu, J. H., & Wang, Y. M. (2006). Measuring KMS success: A respecification of the DeLoneand McLean's model. *Information and Management, 43*(6), 728-739. https://doi.org/10.1016/j.im.2006.05.002

Yeo, G., & Neal, A. (2008). Subjective Cognitive Effort: A Model of States, Traits, and Time. *Journal of Applied Psychology, 93*(3), 617-631.

Yu, D. W., Ji, Y., Emerson, B. C., Wang, X., & Ye, C. (2012). Biodiversity soup: metabarcoding of arthropods for rapid biodiversity assessment and biomonitoring. *Methods in Ecology and Evolution, 3*(4), 613-623.

Yuce, A., Abubakar, A. M., & Ilkan, M. (2019). Intelligent Tutoring Systems and Learning Performance Applying Task-technology Fit and I.S. Success Model. *Online Information Review, 43*(4), 600-616. https://doi.org/10.1108/oir-11-2017-0340