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Drivers of Undergraduate Students' Perceived Usefulness and Satisfaction with Online Learning in Chengdu, China

Haojing Du*

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Abstract

Purpose: The purpose of the study is to deeply explore the factors influencing perceived usefulness and satisfaction of undergraduates towards online learning experiences in China. In constructing the research framework, we selected seven latent variables: perceived ease of use, system quality, information quality, service quality, perceived usefulness, confirmation, and satisfaction. **Research design, data, and methodology:** This study applied quantitative approach, distributing questionnaire to 500 undergraduate students at three universities in Chengdu, Sichuan, China. Before the data collection, Item-Objective Congruence (IOC) and a pilot test of Cronbach's Alpha were adopted to test the content validity and reliability. In data analysis, the researcher used confirmatory factor analysis (CFA) and structural equation modeling (SEM) for statistical analysis to assess key indicators such as validity, reliability, model fits, and path coefficient. **Results:** The results show that perceived ease of use and service quality significantly influence perceived usefulness. The relationship among confirmation, perceived usefulness and satisfaction is supported. Additionally, perceived usefulness significantly influences satisfaction. Nevertheless, system quality and information quality have no significant influence on perceived usefulness. **Conclusions:** This research aims to gain a deeper understanding of the online learning experience to provide useful insights into the field of education.

Keywords : Service Quality, Perceived Usefulness, Confirmation, Satisfaction, Online Learning

JEL Classification Code: E44, F31, F37, G15

1. Introduction

Online learning education is a kind of education and learning mode. It relies on the Internet as the media. Even if people are far apart in the network, they can communicate and learn. They are breaking down the restrictions of space and region. For busy work and study, because the time and place are flexible, network learning provides a convenient way of learning. Information technology provides practical learning tools, such as the Wikipedia platform, which provides convenience for people's learning; much research is dedicated to finding many advantages of online study (Alon & Canon, 2000; Fry, 2001; Hazari, 2004).

China's online learning began to develop on a scale around 2000. However, according to its overall development process, there are four stages: Recording the teaching process in advance and then broadcasting. The second is establishing a distance education platform; the third is for the training institutions to turn online. The fourth is for Internet companies to network learning education (Larson, 2002). In recent years, China has introduced more strategic policies to support the development of network learning. The Ministry of Education of China has successively issued the "Notice on Organizing the Application of" 5G + Smart Education "Application Pilot Project," "China's Education Modernization 2035," and other supporting online learning policies, strengthening the new form of education and promotion (China Research Institute of Commerce and Industry, 2022).

Online learning has high requirements for network technology and system software. In the process of a large

1*Haojing Du, School of Literature and News Communication, Xihua University, China. Email: 1554428813@qq.com

number of online teachings, the teacher's and students' feedback problem is that learning software is prone to lag, the picture needs to be clearer, and the voice video quality. These affect online interaction, which cannot let the students play the enthusiasm of learning; at the same time, network technology, software, and other problems can also affect the students' satisfaction with it (Mohd Basar et al., 2021).

China's online education has a fast and good development in recent years; according to research consulting, due to college students' strong self-control and some college students' clear learning goals, free time, and vision been, college students are the main user groups of online education, in recent years, they, especially in improving degree, job, research, etc., education training demand for online learning has more promotion. Through research gap, this study aims to find out which situations will be affected by the satisfaction of online learning and the study through their perception of availability (system quality, perceived ease of use, information quality, service quality, confirmation).

2. Literature Review

2.1 Perceived Ease of Use

Perceived ease of use refers to the feeling that an individual can operate a system without effort (Camarero et al., 2012). It is when people can operate the system and "get to a certain state" without spending too much effort (Kashive et al., 2020). Perceived ease of use is when using a target system, believing that your experience will help you use the system effectively (Camarero et al., 2012). Perceived ease of use is related to people's ability to use the target system, affecting individual cognitive processing ability (Ortaçtepe, 2016).

Perceived ease of use and perceived usefulness in the technology acceptance model (TAM) are considered to predict the possibility of adopting the technology. This method allows us to predict people's possible personal behaviors in the face of information technology (Chiam et al., 2017). Perceived ease of use impacts the individual's intention to use the target system and thus on perceived usefulness, which is also affected by the user's educational level, use motivation, and past operating experience (Camarero et al., 2012). Thus, this study set a hypothesis:
H1: Perceived ease of use has a significant influence on perceived usefulness.

2.2 System Quality

System quality refers to the software's functionality, the hardware's effectiveness, and the processing speed. This construction can be evaluated or measured by the independent assessment of system operability and utility (Garcia & Silva, 2017). According to the research, this variable refers to the evaluation of students on the functions of the learning software system and the evaluation of users on the system according to the resources provided by the learning software on the Internet and the effectiveness of resource transmission (Rui & Lin, 2018). The research of information systems has developed a model integrating system quality, information quality, and service quality, which greatly influences customer satisfaction.

Through the research results, it is found that in the process of students' personal use of system information, at the same time, the system information function has a great impact on the ease of operation and effectively improves the usefulness (Elmorshidy, 2018) If a person uses the online learning platform for learning, if there is a problem with the system quality in the process, it may cause the person not to choose this platform for operation and use, which will also affect the ease of use and usefulness experience (Shah & Attiq, 2016). System quality is an important component of a network system. In the case of online learning, the system's quality directly impacts the ease of use and perceived usefulness of online learning (Ahn et al., 2004). Hence, a hypothesis is developed:
H2: System quality has a significant influence on perceived usefulness.

2.3.Information Quality

The information systems research has developed a model integration, which greatly influences customer satisfaction. At the same time, the model can maximize the benefits of the information system. Researchers think that the model integrating this variable has the most influence and vitality on information systems research (Aboelmaged, 2018). The quality of information is an influence factor on whether customers are willing to adopt such technology (Garcia & Silva, 2017).

Through experiments, it is found that people's feelings about online learning will be influenced by reasons such as technical quality and that the ease of use and perceived usefulness are positively influenced by these factors (Wang & Xiao, 2009). It is found that the information provided by the online learning software significantly impacts the system's usefulness (Cheng, 2014). In studying the willingness to use online software in some countries, it was found that information quality significantly impacts the perceived usefulness of online software (Lin et al., 2011). Therefore, this study concludes that:
H3: Information quality has a significant influence on perceived usefulness.

2.4 Service Quality

Service quality is about the superiority of network system performance and quality through personal evaluation (Fan et al., 2021). In the research process, it is found that service quality is generally expressed by trust, the response of service staff, and whether it has personalized characteristics (Lin, 2007). According to the research, it can judge whether the target system is successful (Garcia & Silva, 2017). Some studies have found that service quality includes product reliability, materialization, and interactivity.

Service quality needs to be constructed on the basis that the software system is a successful model (Garcia & Silva, 2017). Taiwan is considering the wishes of its staff to promote e-learning. Whether employees are willing to conduct e-learning will be affected by factors such as interface, function, interaction, and service quality (Rui & Lin, 2018). The study found that the quality of service provided by the online learning system greatly impacts the perceived usefulness (Cheng, 2014). So, this researcher refers a hypothesis:

H4: Service quality has a significant influence on perceived usefulness.

2.5 Perceived Usefulness

Perceived usefulness measures how much an individual trusts a system to help him or her on the job. Perceived usefulness refers to people's belief that the targeted system will help them improve their work efficiency (Camarero et al., 2012). Perceived usefulness means that students believe that different types of online learning can help them improve their personal grades and achieve better learning results. Perceived usefulness is a kind of cognition of people, which is related to people's positive and negative thoughts and can also affect individual learning performance (Ortaçtepe, 2016).

In order to study and predict the intentions of private university students to adopt e-learning, the researchers constructed a model based on perceived usefulness (PU) and teaching materials to test the intentions of e-learning (Salimon et al., 2021). Satisfaction with online learning software is the effect of the perceived usefulness received (Lee, 2010). In the Internet environment, the online learning system that people feel useful is likely to be satisfactory. People's perceived usefulness of online learning impacts their Satisfaction (Xu et al., 2017). Consequently, a hypothesis is set:

H5: Perceived usefulness has significant influence on satisfaction.

2.6 Confirmation

Confirmation is the student's perception and operation of the expectation that we will bring benefits (Joo & Choi, 2016). In the study, confirmation refers to the user's feelings and concrete realization of getting good results using online learning resources. That validation strongly affects the technology perception in learning online. Confirmation refers to a perception of the uniformity of customer expectations and specific performance using information systems and technologies (Ifinedo, 2017).

The level of teachers greatly impacts perceived usefulness, confirmation, and flow and also explains the user's satisfaction with the system in the process of using it (Cheng, 2014). The perceived usefulness of e-learning students is adjusted according to their personal verification experience. Therefore, verifying students' expectations of e-learning software will affect the usefulness of the software (Cheng, 2020).

Students' satisfaction with the online learning system is influenced by the perceived usefulness and the confirmation of two important factors, which will also affect whether students continue to use the online learning software in the future (Cheng, 2019). Students' expectations and confirmation of network information impact satisfaction and perceived usefulness and finally affect their willingness to continue to use the information system. This model is simple and easy to understand and has been adopted by many scientific research institutions (Hong et al., 2006). Therefore, this study hypothesizes that:

H6: Confirmation has a significant influence on perceived usefulness.

H7: Confirmation has a significant influence on satisfaction

2.7 Satisfaction

Satisfaction refers to the individual's psychological state resulting from the cognitive assessment of individual hopes and achievement differences (Cheng, 2021). Satisfaction can be understood as the possibility that people use something and meet their expectations. There needs to be more studies on software use satisfaction's influence on students' learning objectives (Ifinedo, 2017). Satisfaction is a psychological feeling that arises about the perception of performance differences (Fan et al., 2021). The research of information systems has developed a model which greatly influences customer satisfaction. At the same time, the model can maximize the benefits of the information system. Researchers think that the model has the most influence and vitality on the research of information systems (Aboelmaged, 2018). Students' satisfaction with e-learning software will affect whether students continue to use the software (Cheng, 2014).

3. Research Methods and Materials

3.1 Research Framework

The conceptual framework of this study is constructed based on the conceptual framework of several researchers. Rui and Lin (2018), Cheng (2014), and Ifinedo (2017) examined the relationship between the seven variables, combined perceived ease of use, system quality, information quality, service quality, perceived usefulness, confirmation, and satisfaction, as exhibited in Figure 1.

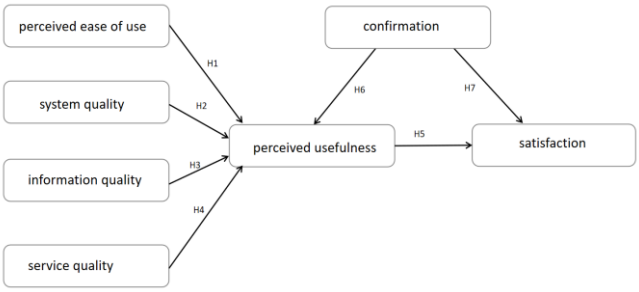

Figure 1: Conceptual Framework

H1: Perceived ease of use has a significant influence on perceived usefulness.
H2: System quality has a significant influence on perceived usefulness.
H3: Information quality has a significant influence on perceived usefulness.
H4: Service quality has a significant influence on perceived usefulness.
H5: Perceived usefulness has significant influence on satisfaction.
H6: Confirmation has a significant influence on perceived usefulness.
H7: Confirmation has a significant influence on satisfaction.

3.2 Research Methodology

In this research, a questionnaire survey was conducted within the context of online learning, with data gathered from students at three universities located in Chengdu, Sichuan, China. The selection of these specific universities was based on various considerations, including students' prior experiences and other relevant factors. The primary purpose of the questionnaire in this study was for research-related objectives, encompassing several crucial components: screening questions, measuring items employing a five-point Likert scale, and a demographic profile section. During the subsequent data analysis phase, the researcher employed statistical techniques such as confirmatory factor analysis (CFA) and structural equation modeling (SEM) to assess critical indicators like validity, reliability, model fit, and path coefficients.

Before commencing data collection, the Item-Objective Consistency Index (IOC) was utilized to establish the questionnaire's validity. To achieve this, the research team enlisted the expertise of four experts drawn from three different universities. The results of their evaluations consistently yielded scores exceeding 0.5, affirming the questionnaire's validity. Subsequently, the researchers conducted pilot tests involving a sample size of 40 individuals to evaluate the reliability of each construct.

The outcomes of these pilot tests revealed that the Cronbach alpha coefficient for the various potential variables exceeded the threshold of 0.7, signifying a high level of internal consistency reliability. These findings validated the suitability of the questionnaire as a valuable investigative tool for this study, as per the guidelines put forth by Hair et al. (2007). Specifically, the Cronbach alpha scores for the different constructs were as follows: Perceived Ease of Use (0.904), System Quality (0.864), Information Quality (0.841), Service Quality (0.851), Perceived Usefulness (0.871), Confirmation (0.790), and Satisfaction (0.943).

3.3 Population and Sample Size

The study's target population comprises a distinct group: undergraduate students enrolled in educational institutions in Chengdu, Sichuan province, China, who have experienced a period of online learning lasting over three months due to the pandemic. As suggested by Soper (2023), it is advisable to maintain a minimum sample size of 425 for optimal research outcomes. Therefore, the study has included a sample size of 500, a robust number that facilitates the effective utilization of the statistical method known as Structural Equation Modeling (SEM). However, after the data screening and handling missing values, 495 were eligible for the data analysis.

3.4 Sampling Technique

In the case of judgmental sampling, the target population was undergraduates divided among three universities located in Chengdu, Sichuan Province, including Xihua University (XU), Chengdu University (CDU), and Sichuan Normal University (SICNU). For quota sampling, it involves selecting survey participants based on shared characteristics or similarities predetermined in advance. This selection process is elaborated in Table 1.

Table 1: Sample Units and Sample Size

Smart Communities	Population Size	Proportional Sample Size
Xihua University (XU)	36265	226
Chengdu University (CDU)	25126	156
Sichuan Normal University (SICNU)	18879	118
Total	**80268**	**500**

Source: Constructed by author

4. Results and Discussion

4.1 Demographic Information

The demographic information provided in this dataset encompasses the characteristics of 495 participants. The dataset includes 197 male participants, which constitutes approximately 39.80% of the total sample. There are 298 female participants, making up the majority at approximately 60.20% of the total sample. The gender distribution indicates that there is a clear majority of female participants in the study, with a substantial gender imbalance.

Among the participants, 114 individuals are classified as freshmen, accounting for around 23.03% of the total sample. The sophomore category comprises the largest group, with 203 participants, making up approximately 41.01% of the total. There are 110 junior students in the dataset, constituting about 22.22% of the sample. Finally, the senior category consists of 68 participants, representing roughly 13.74% of the total. The distribution by year of study indicates that the study includes a diverse range of participants across different academic levels, with sophomores being the most highly represented group.

Table 2: Demographic Profile

Demographic and General Data (N=495)		Frequency	Percentage
Gender	Male	197	39.80%
	Female	298	60.20%
Year of Study	Freshman	114	23.03%
	Sophomore	203	41.01%
	Junior	110	22.22%
	Senior	68	13.74%

Source: Constructed by author.

4.2 Confirmatory Factor Analysis (CFA)

In CFA, Cronbach alpha coefficient greater than 0.7 for all latent variables, suggesting that all measured constructs exhibited high internal consistency reliability (Hair et al., 2007). In line with the guidelines established by Fornell and Larcker (1981), it is considered acceptable when the Composite Reliability (CR) exceeds 0.60 and the Average Variance Extracted (AVE) surpasses 0.40. Furthermore, all the factor loadings for the various structures in our study exceeded 0.50. These results, especially with respect to the Composite Reliability, provide confirmation that the constructs employed in this study indeed exhibit convergent validity.

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
Perceived Ease of Use	Bashir and Madhavaiah (2014)	5	0.843	0.668-0.779	0.844	0.521
System Quality	Cho et al. (2009)	4	0.812	0.689-0.750	0.813	0.521
Information Quality	Lee et al. (2009)	4	0.824	0.674-0.786	0.825	0.542
Service Quality	Ngai et al. (2007)	4	0.833	0.731-0.753	0.834	0.557
Confirmation	Ozkan and Koseler (2009)	4	0.845	0.745-0.788	0.845	0.577
Perceived Usefulness	Bhattacherjee (2001)	4	0.877	0.761-0.828	0.878	0.642
Satisfaction	Bhattacherjee (2001)	4	0.842	0.740-0.769	0.843	0.573

In the realm of statistical analysis, assessing the goodness of fit of a model is a critical step in ensuring the reliability and validity of research findings. The adequacy of a statistical model is often evaluated through a set of predefined criteria, and this essay delves into the process of evaluating model fit using various statistical indicators. Specifically, we explore the criteria outlined in Table 4 and assess the model's fit by comparing the statistical values of individual indicators to these criteria. In summary, the goodness of fit measures, as compared to the predefined criteria, indicates that the model fits the data effectively and is considered acceptable according to these criteria.

Table 4: Goodness of Fit for Measurement Model

Fit Index	Acceptable Criteria	Statistical Values
CMIN/DF	< 3.00 (Al-Mamary & Shamsuddin, 2015; Awang, 2012)	1.160
GFI	≥ 0.85 (Sica & Ghisi , 2007)	0.947
AGFI	≥ 0.80 (Sica & Ghisi, 2007)	0.935
NFI	≥ 0.80 (Wu & Wang, 2006)	0.937
CFI	≥ 0.80 (Bentler, 1990)	0.991
TLI	≥ 0.80 (Sharma et al., 2005)	0.990
RMSEA	< 0.08 (Pedroso et al., 2016)	0.018
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 = normalized fit index, CFI = comparative fit index, TLI = Tucker-Lewis index, and RMSEA = root mean square error of approximation

Fornell and Larcker (1981) put forth a criterion for assessing the acceptability of construct validity, positing that the correlation coefficients between constructs should be lower than the square root of the Average Variance Extracted (AVE) for those constructs. In Table 5, the diagonal entries represent the square root of the AVE for each respective construct. Notably, these diagonal values are observed to be greater than the correlation coefficients linking the different constructs. This observation strongly indicates that the discriminant validity of the model is robust and meets the criteria for acceptability. Consequently, the results derived from this study offer empirical evidence affirming the sound discriminant validity of the structural framework employed in the research, as shown in Table 5.

Table 5: Discriminant Validity

	PEOU	SYQ	IQ	SEQ	CONF	PU	SAT
PEOU	**0.722**						
SYQ	0.303	**0.722**					
IQ	0.321	0.282	**0.736**				
SEQ	0.276	0.226	0.227	**0.746**			
CONF	0.270	0.286	0.268	0.295	**0.746**		
PU	0.341	0.225	0.207	0.279	0.335	**0.801**	
SAT	0.416	0.434	0.446	0.374	0.485	0.422	**0.757**

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

4.3 Structural Equation Model (SEM)

To assess whether our undergraduate model fits well with the data, we compared it with the acceptable range of goodness-of-fit provided in Table 6. The results showed that our model performed well on all the fit metrics. Specifically, CMIN / DF was 2.218, GFI reached 0.884, AGFI 0.864, RMSEA 0.050, CFI reached 0.927, NFI 0.876, and TLI 0.920.

Table 6: Goodness of Fit for Structural Model

Index	Acceptable	Statistical Values
CMIN/DF	< 3.00 (Al-Mamary & Shamsuddin, 2015; Awang, 2012)	2.218
GFI	≥ 0.85 (Sica & Ghisi , 2007)	0.884
AGFI	≥ 0.80 (Sica & Ghisi, 2007)	0.864
NFI	≥ 0.80 (Wu & Wang, 2006)	0.876
CFI	≥ 0.80 (Bentler, 1990)	0.927
TLI	≥ 0.80 (Sharma et al., 2005)	0.920
RMSEA	< 0.08 (Pedroso et al., 2016)	0.050
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 = normalized 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 results of the Structural Equation Modeling (SEM) analysis provide strong support for the hypotheses that were tested. Each hypothesis examined the relationship between a specific factor and intention to use a particular product or service. Based on the results, all of these relationships were found to be statistically significant at a very high level of confidence ($p < 0.001$), indicating robust support for the proposed hypotheses.

Table 7: Hypothesis Results of the Structural Equation Modeling

Hypothesis	(β)	t-Value	Result
H1: PEOU→PU	0.272	5.323***	Supported
H2: SYQ→PU	0.089	1.762	Not Supported
H3: IQ→PU	0.055	1.115	Not Supported
H4: SEQ→PU	0.176	3.498***	Supported
H5: PU→SAT	0.238	4.691***	Supported
H6: CONF→PU	0.347	6.933***	Supported
H7: CONF→SAT	0.440	8.190***	Supported

Note: *** p<0.001
Source: Created by the author

H1. The data presented in Table 7 confirm the hypothesis that perceived usefulness significantly influences perceived usefulness. This finding aligns with the study conducted by Ortaçtepe (2016), where it was observed that perceived ease of use positively impacts perceived usefulness within the undergraduate group. This relationship is supported by a β value of 0.272 and a t-value of 5.323.

H2. The data in H2 underscore the need to validate the assumption that system quality affects perceived usefulness. Contrary to the findings of Garcia and Silva (2017), the research data from undergraduate groups suggest that system quality does not have a significant impact on perceived usefulness. This conclusion is substantiated by a β value of 0.089 and a t-value of 1.762.

H3. The data pertaining to H3 highlight the necessity of validating the assumption that information systems influence perceived ease of use. In contrast to the study by

Aboelmaged (2018), the research data from undergraduate groups indicate that information systems have no discernible impact on perceived usefulness. This assertion is based on a β value of 0.055 and a t-value of 1.115.

H4. The data in H4 substantiate the assumption that the quality of service significantly influences perceived usefulness. Building on the research of Rui and Lin (2018), the findings from the undergraduate group's research data indicate a positive impact of service quality on perceived usefulness, as demonstrated by a β value of 0.176 and a t-value of 3.498.

H5. The data for H5 confirm the hypothesis that perceived usefulness has a substantial impact on satisfaction. Consistent with the research conducted by Camarero et al. (2012), the research data from the undergraduate group indicate a positive relationship between perceived usefulness and satisfaction, supported by a β value of 0.238 and a t-value of 4.691.

H6. The data in H6 validate the hypothesis that confirmation significantly influences perceived usefulness. In accordance with the study by Ifinedo (2017), the research data from the undergraduate group indicate a positive impact of confirmation on perceived usefulness, as evidenced by a β value of 0.347 and a t-value of 6.933.

H7. The data pertaining to H7 confirm the hypothesis that confirmation significantly impacts satisfaction. Building on the research by Cheng (2021), the findings from the undergraduate group's research data suggest that confirmation indeed influences satisfaction, supported by a β value of 0.440 and a t-value of 8.190.

5. Conclusion and Recommendation

5.1 Conclusion and Discussion

The present study sought to investigate the factors that influence the perceived usefulness and satisfaction of undergraduate students with regard to their online learning experiences in China. The research framework comprised seven latent variables: perceived ease of use, system quality, information quality, service quality, perceived usefulness, confirmation, and satisfaction. Through a quantitative approach, questionnaires were administered to 500 undergraduate students across three universities in Chengdu, Sichuan, China. The study meticulously employed Item-Objective Congruence (IOC) and a pilot test of Cronbach's Alpha to evaluate content validity and reliability, respectively. Data analysis relied on confirmatory factor analysis (CFA) and structural equation modeling (SEM) to assess various critical indicators, including validity, reliability, model fits, and path coefficients. The study's findings have significant implications for the understanding of online learning experiences and the factors influencing student satisfaction and perceived usefulness.

The results of this study provide valuable insights into the factors that shape undergraduate students' perceptions of online learning in China. The study revealed that both perceived ease of use and service quality significantly influence perceived usefulness. This implies that when online learning platforms are designed with a focus on user-friendliness and high-quality service provision, students are more likely to perceive the learning experience as valuable and useful. Institutions and educators should prioritize the user experience and service quality when developing online learning environments.

The research supports the relationship between confirmation (students' preconceived expectations) and perceived usefulness. This underscores the importance of managing students' expectations and ensuring that the online learning experience aligns with what they anticipate. Institutions should communicate clearly and consistently about the nature and benefits of online courses to enhance students' confirmation and perceived usefulness.

The study affirmed that perceived usefulness significantly influences student satisfaction. This finding underscores the pivotal role of perceived usefulness in determining overall satisfaction with online learning. When students perceive online learning as valuable and beneficial, they are more likely to report higher levels of satisfaction.

Interestingly, the study did not find a significant influence of system quality and information quality on perceived usefulness. This suggests that while these factors are important in the design and delivery of online courses, they may not directly impact students' perceptions of usefulness. Nonetheless, it is essential for educational institutions to maintain high standards of system and information quality for the overall effectiveness of online learning.

In conclusion, this study's findings offer valuable guidance for educational institutions and course designers aiming to enhance the online learning experiences of undergraduate students in China. Prioritizing user-friendliness, service quality, and aligning students' expectations with the online learning experience can contribute to improved perceived usefulness and satisfaction. Additionally, ongoing efforts to maintain high standards of system and information quality remain critical for the success of online learning initiatives. Further research and adaptation of strategies based on these findings can lead to more effective and satisfying online education experiences for students in China and beyond.

5.2 Recommendation

Based on the findings of this study, several recommendations can be made to enhance the online

learning experiences of undergraduate students in China. Educational institutions should invest in user-friendly online learning platforms. This includes improving the design, navigation, and accessibility of these platforms to make them intuitive and easy to use. Providing clear instructions and resources for students can help reduce barriers to entry and ensure a smoother learning experience.

Institutions should place a strong emphasis on service quality in online education. This involves providing timely and responsive support for technical issues, as well as academic and administrative inquiries. Ensuring that students have access to dedicated support channels can significantly enhance their overall experience. To improve confirmation and perceived usefulness, institutions should proactively manage student expectations. Clear communication about course objectives, content, assessment methods, and technical requirements can help align students' expectations with the reality of the online learning experience. Regular updates and guidance throughout the course can also help maintain alignment.

Educational institutions should continuously monitor and evaluate the quality of online courses. Collecting feedback from students and instructors can provide valuable insights for improvement. Regular updates and enhancements to course content, technology, and instructional methods can contribute to a better learning environment. Instructors play a crucial role in the success of online learning. Providing professional development opportunities and training for instructors in online teaching methods, technology integration, and effective communication can lead to better course delivery and improved student satisfaction.

Foster a sense of community and interaction among online learners. Encourage collaborative activities, discussions, and peer-to-peer learning opportunities. Online forums, group projects, and virtual office hours can facilitate engagement and create a more enriching learning environment. While these factors did not directly impact perceived usefulness in this study, it remains essential for institutions to maintain high standards of system and information quality. Ensure that the technology infrastructure is robust, reliable, and up-to-date. Also, verify that course content is accurate, relevant, and well-organized.

Stay informed about emerging technologies and best practices in online education. Be open to adapting instructional strategies and tools to meet the evolving needs and expectations of students. Regularly review and update online courses to keep them current and effective. Create a supportive learning environment that takes into consideration the diverse needs of online learners. Offer resources such as academic advising, counseling services, and technical assistance to address both academic and personal challenges that students may face. Periodically evaluate the effectiveness of online learning initiatives and share success stories and best practices within the institution. This can inspire a culture of continuous improvement and innovation in online education.

Incorporating these recommendations into the design and delivery of online courses can contribute to a more positive and rewarding online learning experience for undergraduate students in China, ultimately leading to higher satisfaction and perceived usefulness.

5.3 Limitation and Further Study

While this study has provided valuable insights into the factors influencing the perceived usefulness and satisfaction of undergraduate students towards online learning experiences in China, there are several limitations that should be considered by researchers conducting future studies in this area. First, the sample for this study was drawn from three universities in Chengdu, Sichuan, China. Future research should aim to include a more diverse and representative sample from different regions and types of institutions to enhance the generalizability of findings. Second, while this study primarily employed quantitative methods, future research can complement these findings with qualitative research techniques, such as interviews or focus groups. Qualitative insights can provide a richer understanding of students' experiences and the reasons behind their perceptions. Third, the study focused on specific latent variables, but there may be other factors not considered in this research that influence perceived usefulness and satisfaction in online learning. Future studies should explore additional variables that may contribute to a more comprehensive model.

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