Key Factors Shaping Students' E-Learning Satisfaction in Higher Education: A Study in Chengdu, China

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Abstract

Purpose: This research aimed to enhance student satisfaction by fostering social presence, quality of service, information, learner, and perceived usefulness. **Research Design, Data, and Methodology:** The sample was 80 full-time students from the three main colleges of Xihua University. The change level was determined by conducting the same questionnaire before and after the strategic plan (SP). The data was analyzed, and the hypotheses were tested using mixed methods research. Experts conducted the item-objective congruence (IOC) test and pilot test, and multiple linear regression (MLR) indicated that mean values change significantly for those six variables between pre- and post-SP. The strategic plans included team establishment, goal setting, SWOT analysis, policy support, and course program. **Results:** Findings from qualitative research methods proved improvements in all variables between the pre-and post-SP. Additionally, innovative approaches to improving student satisfaction are discussed, along with recommendations and limitations for future research. **Conclusions:** Learners' attitudes and self-discipline play crucial roles in influencing satisfaction with online learning. A negative learning attitude, reluctance to engage in online platforms, a tendency to passively absorb information in traditional settings, and a lack of initiative are key factors that diminish satisfaction in online learning environments.

Keywords: Service Quality, Information Quality, Learner Quality, Perceived Usefulness, Student Satisfaction

JEL Classification Code: I23, J28, L2

1. Introduction

With the emergence of the information era, the teaching of colleges and universities is dynamically innovated and optimized. Education involves Internet information technology, and online education has emerged as a preferred teaching paradigm promoted by colleges and universities. Online teaching can break away from the constraints of traditional teaching classrooms, fit students' current learning intentions and lifestyles, and promote innovation in teaching. In particular, the COVID-19 epidemic had a major impact on higher education. During the pandemic, online learning has become the main learning way for students, which has had a profound impact on students' daily learning habits after the pandemic. Secondly, online learning is a learner-centered learning method that greatly meets the individualized learning needs of learners. As a product of the times in the context of "Internet+" education, information-based education, and the modernization of education, online education embodies the characteristics of strong interactivity and outstanding flexibility. Abundant and diversified learning resources provide self-education, self-learning, and self-development conditions. For teachers, online education helps to improve students' independent learning ability, which requires students to solve problems based on independent learning and creation. It is committed to the embodiment of students' internal drive. For university and college students, online education mainly fulfills their lifelong development goals. At the same time, it has also exposed many problems that students have in the online learning process, highlighting the urgent need for effective coping strategies when transitioning to the learning way

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combined with online and offline learning in the post-pandemic era. Evaluating students' satisfaction is an important way to supervise and evaluate the quality of online learning in higher education institutions with an Internet background. In order to enhance the caliber of online education and the advancement of practical skills, it is crucial to conduct empirical research on the variables that impact student satisfaction in higher education institutions. This research will enable the prompt identification and resolution of issues and efficient implementation of student-focused strategic plans to enhance students' learning goals. The research's main objective is to determine the variables that impact satisfaction during online learning and evaluate how student-centered strategic plans can improve the learning experience.

2. Literature Review

2.1 Service Quality

Service quality pertains primarily to the reliability of customer service offered by institutions (Parasuraman et al., 1988). According to Cronin and Taylor (1992), service quality remains a predominant impression that a service provider leaves with their customers. Elfaki et al. (2019) found that the response and viewpoints of staff technical expertise are related to service quality, which means the level of assistance given to the system's end user. Service quality is an essential component impacting customer satisfaction, as shown by Liu et al. (2009). Factors affecting student satisfaction with e-learning systems have also been explored, as noted by Sun et al. (2008). Thence, an indicated hypothesis is developed:
H1: Service quality has a significant impact on students' satisfaction.

2.2 Information Quality

User satisfaction is significantly influenced by the caliber of information available on online learning platforms and the overall system's effectiveness (DeLone & McLean, 2003). Syed et al. (2021) focused on analyzing the e-learning training system's impact on e-Milea users' satisfaction, with a particular emphasis on the quality of information, service, and system. Syed et al. (2021) found that e-learning implementation is positively impacted by faculty experience in e-learning. This highlights the significance of ensuring high-quality information to enhance the learning experience in e-learning platforms. Besides, analyzing reviews of e-learning platforms is essential to evaluate the quality of courses effectively. For example, Muralidharan et al. (2021) emphasized the importance of using standard techniques to

analyze web reviews efficiently, considering the vast amount of information available. This approach helps learners assess the information quality of e-learning platforms and make informed decisions about their effectiveness. Thence, an indicated hypothesis is developed:
H2: Information quality has a significant impact on students' satisfaction.

2.3 Learner Quality

According to Navimipour and Zareie (2015), attitude is associated with learner quality. Students' attitude is an assessment of the engagement capacity in online learning tasks and enhance existing knowledge (Al-Fraihat et al., 2017). It demonstrates a correlation between the learner's attitudes, apprehension levels, prior experiences, self-efficacy, and learning process. The quality of the learner is subsequently evaluated based on a range of factors such as the student's attitude, anxiety level, previous experience, and sense of self-efficacy. Sun et al. (2008) identified critical factors, including instructional attitude toward e-learning, learner computer anxiety, perceived utility, course quality, course flexibility, and diversity in assessments that impact learners' perception of satisfaction. Thence, an indicated hypothesis is developed:
H3: Learner quality has a significant impact on students' satisfaction.

2.4 Social Presence

The impact of social presence depends on aspects such as the level of interaction and self-regulation (Suryanto et al., 2024). Horzum (2017) study emphasized the importance of interaction, social presence, and satisfaction in online learning. The findings suggest that these factors significantly contribute to students' satisfaction with e-learning experiences. Additionally, Wijaya et al. (2021) quantitative research revealed noteworthy correlations between perceived social presence and satisfaction with online discussions, indicating a direct impact on student satisfaction levels during virtual learning activities. In summary, although further investigation is required to examine the precise processes by which social presence impacts satisfaction, current literature emphasizes its crucial function in establishing efficient online learning settings. Thence, an indicated hypothesis is developed:
H4: Social presence has a significant impact on students' satisfaction.

2.5 Perceived Usefulness

The term perceived usefulness is the level at which an individual believes utilizing a particular system could

enhance their job performance. This implies that it is the degree to which an individual perceives that the system has the potential to enhance their performance (Rahmi et al., 2018). Gupta et al. (2020) introduced an expanded expectation-confirmation model to explore the impact of pre-adoption expectancy on post-adoption satisfaction. The study conducted by Arbaugh (2000) supported the hypothesis that the course software's perceived utility would correlate positively with student satisfaction with a distance learning program. Dorobăţ et al. (2019) conducted research that supports the notion that a student's belief that e-learning can improve their academic performance is directly related to their perception of its value. Thence, an indicated hypothesis is developed:

H5: Perceived usefulness has a significant impact on students' satisfaction.

2.6 Students' Satisfaction

User satisfaction is the degree of satisfaction of those who experience assistance services, internet pages, and reports (Petter et al., 2008). The qualitative literature on online educational procedures emphasizes that the website's quality is associated with students' learning requirements, the availability of excellent instruction, and the online education system, all which impact students' satisfaction (Alkhattabi et al., 2011). Previous studies underscore the significance of understanding user satisfaction with online learning platforms and various factors that impact their experiences. Lim et al. (2008) assessed learner satisfaction with online learning and found that participants rated their satisfaction slightly below the mid-level on a Likert scale. Therefore, this study aims to evaluate the effects of e-learning by measuring learner satisfaction and exploring the impact of preceding factors on satisfaction.

3. Research Methods and Materials

3.1 Research Framework

This research evaluates various factors that impact the level of satisfaction experienced by full-time students who will graduate between 2025-2027 and have been experiencing online courses in China. Based on Figure 1, the conceptual framework of this research is adapted from the three previous research models of researchers (Candra & Jeselin, 2024; Nedeljković & Rejman Petrović, 2023; Nyathi, 2023). The key variables are presence, perceived usefulness, students' satisfaction and quality of service, information, learner, and social (see Figure 1).
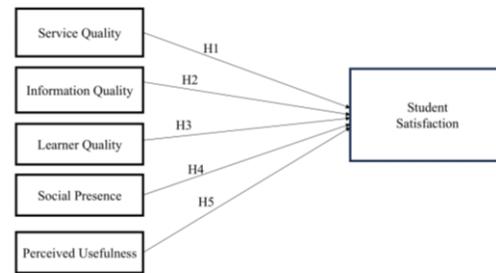

Figure 1: Conceptual Framework

H1: Service quality has a significant impact on students' satisfaction.

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

H3: Learner quality has a significant impact on students' satisfaction.

H4: Social presence has a significant impact on students' satisfaction.

H5: Perceived usefulness has a significant impact on students' satisfaction.

3.2 Research Methodology

The research process comprises four distinct stages. The entire research population (n=80) was initially surveyed to collect data for the proposed conceptual framework. Subsequently, all hypotheses underwent rigorous testing using multiple linear regression to determine their significance at a p-value threshold of less than 0.05. As a result, hypotheses that received support were retained, while those that did not meet the criteria were eliminated.

The second stage involved conducting a pre-SP survey on the remaining 80 students within the supported hypotheses. The third stage introduced the SP, specifically implemented with 30 participants. In the final stage, 30 SP participants completed a survey, generating the necessary data for conducting a paired-sample t-test analysis to evaluate the SP results. This comprehensive process allowed for thoroughly examining the research's objectives and hypotheses.

3.3 Research Population, Sample Size, and Sampling Procedures

3.3.1 Research Population

The researcher selected 80 XHU students as the research population to implement the pre-survey and distribute the questionnaires to the students from the three major colleges: the College of Economy, Aeronautics & Astronautics, and

Emergency & Management. In total, 80 students received the questionnaire via WeChat. Afterward, the researcher checked all responses and confirmed that 50 responses were valid.

3.3.2 Sample size

The researcher implemented a random pilot survey of students and verified reliability by pilot test. Afterward, the researcher identified 80 XHU students as the research population and gained 50 valid responses. Then, the researcher investigated through multiple linear regression with 30 selected participants, identifying the relationship between independent variables and dependent variables. Finally, the remaining 30 voluntary students were involved in the SP stage.

3.3.3 Sampling Procedures

The researcher conducted several sampling-related sampling procedures as follow:

Sampling 1: Sampling for pilot survey and pilot test. The researchers sampled 80 students randomly by asking them to fill out the survey questionnaire and give feedback on the pilot survey and pilot test.

Sampling 2: Sampling for Pre-survey. The researcher sampled 80 XHU students from three different college students for the pre-survey by distributing a survey questionnaire via WeChat. Afterward, the researcher checked all responses and confirmed that 50 responses were valid.

Sampling 3: Sampling for SP. The researcher randomly selected and sampled 30 voluntary students to implement SP.

3.4 Research Instruments

3.4.1 Design of Questionnaire

The researcher designed a survey questionnaire by following three steps:

Step 1: Develop the research instruments. Research listed the questions with sources from openly published articles (Al-Fraihat et al., 2020; Cheng, 2023; Dorobăț et al., 2019; Lin et al., 2017; Queiros & de Villiers, 2016; Tarhini et al., 2016).

Step 2: Adjusting and presenting the survey content. Research conducted a survey on full-time students in the Chinese context.

Step 3: Implementing IOC.

3.4.2 Components of Questionnaire

Items of the questionnaire were composed of the following three parts:

Part 1: Basic info Questions. There were questions to gain basic info on the research population, including gender, age, duration, and so on.

Part 2: Pre- and Post-SP Survey Questions. Questions were asked for pre- and post-surveys to determine the current situation of IV and DV for the 30 selected students.

3.4.3 IOC Results

In this IOC process, independent experts, scholars, or doctors are marked +1 for Congruent, 0 for Questionable, and -1 for Incongruent. Before the data collection, the IOC and pilot test established the reliability of Cronbach's Alpha with a sample size of 50 participants. Three experts are participating in the IOC exam. Results were evaluated by three specialists who rated them above 0.67.

3.4.4 Pilot survey and Pilot test results

The researcher randomly implemented a pilot survey of 80 students by asking them to fill out the questionnaire and give feedback with 50 valid questionnaires. Afterward, the researcher performed Cronbach's Alpha test to examine the reliability of internal consistency. The expected outcomes for this test are 0.7 or above (Nunnally, 1975). The findings indicate that a pilot test was carried out by applying a sample of 50 participants, and Cronbach's alpha coefficient values generated surpassed the acceptable standard of 0.7. The internal consistency values showed service quality = 0.896, information quality = 0.919, learner quality = 0.904, social presence = 0.898, perceived usefulness = 0.910, students' satisfaction = 0.883.

Table 1: Pilot Test Result

Variables	No. of Items	Sources	Cronbach's Alpha	Strength of Association
Service Quality	4	Cronin and Taylo (1992)	0.896	Very Good
Information Quality	5	DeLone and McLean (2003)	0.919	Excellent
Learner Quality	5	Al-Fraihat et al. (2017)	0.904	Excellent
Social Presence	5	Horzum (2017)	0.898	Very Good
Perceived Usefulness	4	Gupta et al. (2020)	0.910	Excellent
Student Satisfaction	5	Petter et al. (2008	0.883	Very Good

4. Results and Discussion

4.1 Results

4.1.1 Demographic Profile

The researcher outlined the demographic profile of the entire research population (n=178) and provided specific details of the subset of students (n=30) who participated in the SP, as illustrated in Table 2.

Table 2: Demographic Profile

Research population (n=50)		Frequency	Percent
Gender	Male	26	52.00%
	Female	24	48.00%
Age	Under 18	8	16.00%
	18-22	25	50.00%
	Over 22	17	34.00%
Education level	Undergraduate	42	84.00%
	Postgraduate	8	16.00%
E-learning Frequency	Never	6	12.00%
	Sometimes	17	34.00%
	Frequently	27	54.00%
E-learning experience	Less than 1 years	18	36.00%
	1-2 years	8	16.00%
	2-3 years	17	34.00%
	Over 3 years	7	14.00%
Research population (n=30)		Frequency	Percent
Gender	Male	16	53.33%
	Female	14	46.67%
Age	Under 18	5	16.67%
	18-22	15	50.00%
	Over 22	10	33.33%
Education level	Undergraduate	27	90.00%
	Postgraduate	3	10.00%
E-learning Frequency	Never	4	13.33%
	Sometimes	17	56.67%
	Frequently	9	30.00%
E-learning experience	Less than 1 years	15	50.00%
	1-2 years	5	16.67%
	2-3 years	6	20.00%
	Over 3 years	4	13.33%

4.1.2 Results of multiple linear regression

The researcher conducted Multiple Linear Regression (MLR) on 30 survey questionnaire results and found out whether each hypothesis was supported. There were ten research hypotheses, among which the first five were related to the dependent variable of students' satisfaction. Based on the variance inflation factor (VIF) analysis, it can be concluded that multi-collinearity was not a concern since the VIF value should be less than 5 (Hair, 2011). The R-squared (R2) in a multiple linear regression model with five independent variables can account for 80.4% of student satisfaction variability (see Table 3).

Table 3: The multiple linear regression of five independent variables on student's satisfaction

Variables	Coefficients	t - value	P-value	VIF	R	R2
Service Quality	0.360	4.219*	<0.01	1.3		
Information Quality	0.251	2.342*	0.028	1.52		
Learner Quality	-0.221	-2.065*	0.05	1.53	0.897	0.804
Social Presence	0.259	2.326*	0.029	2.17		
Perceived Usefulness	0.317	2.845*	0.009	1.79		

Note: p-value <0.05*

In sum, the five hypotheses were all supported. Afterwards, SP was conducted to follow below hypotheses:

H6: There is a significant mean difference in service quality between pre- and post-strategic plan stages.

H7: There is a significant mean difference in information quality the pre-and post-strategic plan stages.

H8: There is a significant mean difference in learner quality between the post-strategic plan stages.

H9: There is a significant mean difference in social presence between pre- and post-strategic plan stages.

H10: There is a significant mean difference in perceived usefulness between pre- and post-strategic plan stages.

H11: There is a significant mean difference in student satisfaction between pre- and post-strategic plan stages.

4.2 SP Stage

The SP lasted for 12 weeks and was based on quantitative and qualitative data collected at the pre-SP stage to achieve the purpose of this research, which was developing students' satisfaction. The researcher illustrated the strategic plan in chronological order (see Figure 2).
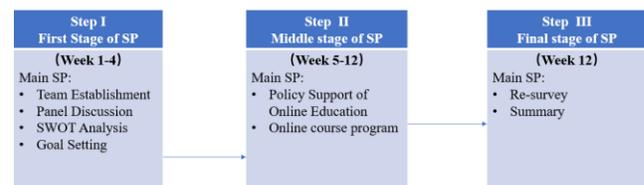

Figure 2: SP Activities

4.3 Results Comparison between Pre-SP and Post-SP

In quantitative analysis, the researcher conducted the same survey before and after SP. The researcher implemented a paired-sample t-test to determine the differences in the variables before and after the SP. Difference of variables between pre- and post-SP (see Table 4).

Table 4: Paired-Sample T-Test Results

Variables	Mean	SD	Men Difference	p-value
Service Quality				
Pre-SP	3.65	0.918	0.28	<0.001
Post-SP	3.93	0.830		
Information Quality				
Pre-SP	2.97	0.791	0.94	0.028
Post-SP	3.91	0.762		
Learner Quality				
Pre-SP	3.37	0.761	0.61	0.050
Post-SP	3.98	0.761		
Social Presence				
Pre-SP	3.49	0.909	0.47	0.029
Post-SP	3.96	0.882		
Perceived Usefulness				
Pre-SP	3.92	0.824	0.04	0.009
Post-SP	3.96	0.876		
Student Satisfaction				
Pre-SP	3.86	0.760	0.14	<0.001
Post-SP	4.00	0.831		

There was a significant increase in Service Quality between post-SP (M=3.93, SD=0.830) stage and pre-SP stage (M=3.65, SD=0.918), while P<0.001 and mean value difference between post-SP stage and Pre-SP stage was 0.28. Therefore, H6 was supported that there is a substantial difference in the mean value of service quality between pre-SP and post-SP.

There was a significant increase in Information Quality between post-SP (M=3.91, SD=0.762) and pre-SP stage (M=2.97, SD=0.791), while P=0.028 and mean value difference between post-SP stage and Pre-SP stage was 0.94. Therefore, H7 was supported that there is a substantial difference in the mean value of information quality between pre-SP and post-SP.

There was a significant increase in Learner Quality between post-SP (M=3.98, SD=0.761) stage and pre-SP stage (M=3.37, SD=0761), while P=0.05 and mean value difference between post-SP stage and Pre-SP stage was 0.61. Therefore, H8 was supported that there was a substantial difference in the mean value of learner quality between pre-SP and post-SP.

There was a significant increase in Social Presence between post-SP (M=3.96, SD=0.882) stage and pre-SP stage (M=3.49, SD=0.909), while P=0.029 and mean value difference between post-SP stage and Pre-SP stage was 0.47. Therefore, H9 was supported that there was a substantial difference in the mean value of social presence between the pre-SP and post-SP.

There was a slight increase in Perceived Usefulness between post-SP (M=3.96, SD=0.876) stage and pre-SP stage (M=3.92, SD=0.824), while P=0.009 and mean value difference between post-SP stage and Pre-SP stage was 0.04. Therefore, H10 was supported significantly that there was a small average difference in perceived usefulness between the pre-SP and post-SP.

There was a significant increase in Student Satisfaction between post-SP (M=4.00, SD=0.831) stage and pre-SP stage (M=3.86, SD=0.760), while P<0.001 and mean value difference between post-SP stage and Pre-SP stage was 0.14. Therefore, H11 was supported significantly that there was an average difference in the mean value of student satisfaction between the pre-SP and post-SP.

After implementing proposed strategic plans, positive mean differences in service quality, information quality, learner quality, social presence were significantly increased, and positive mean difference in perceived usefulness was not significantly increased according to the qualitative and quantitative analysis results.

5. Conclusions, Recommendations and Limitations

5.1 Conclusions & Discussions

The aim of this research is to study and improve quality of service, information, learners, and sense of social presence, perceived usefulness of students during online learning at XHU. Quantitative and qualitative analyses are used to achieve research objectives. Based on two selected theories the researcher developed a conceptual framework: TAM and UTAUT. Results proved that SPs increased five variables, and the significance value of the survey data was not greater than 0.05, indicating that there was a statistically significant change seen during SP, but there was still a small average difference in perceived usefulness between the pre-SP and post-SP.

Chinese high educational institutions lack sufficient focus on harnessing the potential of online learning, resulting in inadequate proficiency in fundamental computer skills

among some students. Learners cannot acquire useful knowledge through online learning in a timely and effective way, which leads to a decrease in the frequency of learners' use of online learning systems, and even negative emotions such as avoidance and boredom.

Learners' attitude and self-discipline are also important factors affecting online learning satisfaction. Learners' negative learning attitude, unwillingness to engage in online learning, accustomed to passively absorbing knowledge offline, and lack of learning initiative are important factors affecting online learning satisfaction. Secondly, learners lack self-discipline in learning, cannot focus on learning content, and lack learning supervision, which leads to low learning efficiency and inability to effectively complete learning tasks.

Whether the online learning system technology is advanced is an important aspect that affects learners' online learning satisfaction. The data obtained in this study also found that learners' perception of gain in system operation is one of the most important factors affecting online learning satisfaction. However, what we did not expect is that this perception of gain is not very predictive of satisfaction, and the difference in satisfaction before and after the test is not obvious. This may also be because after learners are relatively satisfied with the current level of perception of gain in online system operation, further improvement of related technologies does not significantly improve satisfaction.

The abundance of online educational materials, which is the primary determinant of satisfaction with online learning, has the lowest overall rating. The potential explanation is that the majority of online learning platforms provide only limited access to resources for free, while access to comprehensive learning and tutoring materials necessitates payment. This financial barrier poses difficulties for students, hindering their ability to fully benefit from these resources.

Although online learning is cheap, it is deficient in direct interpersonal contact and cooperation. Regarding learning habits, learners prefer in-person, offline instruction., but learning with e-learning systems is carried out through text reading, online videos, or voice communication. Learners and teachers have not yet fully adapted to it, which has become an important problem in promoting the implementation strategy of e-learning education. On the other hand, learners and teachers lack awareness of the effectiveness of collaboration and communication in e-learning systems, believe that offline learning is more efficient and convenient, and are unwilling to change their long-term offline learning habits. This is another reason for their rejection of such teaching technologies.

5.2 Recommendations

The analysis of the status of students' satisfaction shows that the overall learning satisfaction of learners in this study is at an upper-middle level, and the overall learning satisfaction is relatively good, but there is still room for improvement. Therefore, it is necessary to seek effective countermeasures to improve students' online learning satisfaction, so as to ensure the long-term development of online education in schools.

In the dimension of service quality, when conducting online learning, the operation technology should not be too complicated. Learners should be able to understand and obtain useful information anytime and anywhere, so as to encourage learners to actively use online learning platforms to learn. The Internet is becoming the main learning way for learners, and requirements for the high-quality course content are constantly growing. Despite the challenges of quickly adjusting to online learning, designers should prioritize enhancing the design of teaching content and expanding course-related resources to optimize the effectiveness of online learning.

In the dimension of learner quality, teachers should actively guide learners to change their learning attitudes, establish correct knowledge values, actively participate in learning, and interact well with teachers and classmates. Improve the understanding of the major you have learned, truly integrate into professional learning, and have the courage to explore deeper professional knowledge. Learning In the era of knowledge economy with intensified globalization, learners obtain a variety of information every day. Teachers should strengthen online learning propaganda, guide learners to enhance their self-discipline awareness, correctly view online learning, actively resist the temptation of the Internet, and prevent learners from becoming addicted to the Internet.

In the dimension of information quality, the educational course resources on the Internet are also uneven. Therefore, the relevant competent authorities should formulate relevant standards and review systems to enhance the quality of courses content, reduce time cost to screen valuable information, and increase the use rate of learners. Universities should enrich the types of online learning resources and provide learners with diversified, personalized and interesting online learning resources.

In the dimension of social environment perception, by influencing students' mutual communication and then acting on learning methods, it will eventually impact learners' learning satisfaction. Teachers adopt encouraging teaching methods to facilitate learners to better feel the support of teachers and achieve active interaction in the teaching process. In addition to teaching activities, teachers should

take the initiative to understand and care about learners and achieve mutual interaction outside the teaching process. Communication and interaction between learners are particularly important. In the daily learning process, teachers should organize learners to form learning groups to create a good interactive atmosphere, reduce their loneliness during online learning, and improve online learning experience.

In the dimension of perceived value, the online learning system research and development should be further strengthened according to the learners' usage needs. Simultaneously, the information system department should provide a feedback mechanism to address any system problems that learners may experience, so enhancing their satisfaction. In addition, the information system department should provide learners with guidance steps for daily learning to support learners to use it efficiently, quickly, and easily, expand the coverage of daily teaching content, and provide students with high-speed data transmission networks that can be easily accessed on campus. Hence, to ensure the retention of learners during online learning, it is essential to set up and develop online learning platforms that provide superior value in comparison to other modes of learning.

5.3 Limitations for Future Research

Although this study provides a reference for the impact of student satisfaction, there are still some shortcomings in this study due to the limitation of objective factors such as time and region, which need to be improved in the follow-up research on the factors of online learning satisfaction.

Sample size: The study focused on a specific group of students from XHU. In the future, research on sample diversity should be strengthened, and students from different educational backgrounds, age groups, and cultural backgrounds should be added to the sample for evaluation.

Research subjects: This study only investigated the impacting factors of satisfaction of public university students, but the purpose and educational philosophy of colleges and universities are different, therefore the conclusions of this study are not representative for students from or vocational colleges and universities.

Variables: The study only focused on five specific independent variables and one dependent variable. Future research can explore the research dimension of the independent variables and its potential strategic plan implementation, to understand the influencing factors of the strategy on online learning satisfaction more comprehensively.

Strategic plan: The study designed a specific online course, but it was not actually implemented. Future research should explore the combination of the implementation and design of the strategic plan design, to compare the gap between the design and implementation of the strategy and

to improve the effectiveness of student satisfaction with online learning.

Further research into student satisfaction with distance education could incorporate concepts of personal development and growth into the analysis. Longitudinal studies may reveal how students' perceptions of satisfaction evolve over the course of their educational journey and subsequent careers. Furthermore, exploring differences in satisfaction across different colleges and universities, including students from private or vocational colleges and universities, could draw a whole picture that factors influencing on experiences of online education.

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