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An Examination on Influencers of Student Satisfaction with the Use of E-Learning in Higher Education in Hangzhou, China

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Abstract

Purpose: This study explores factors influencing undergraduate students' e-learning satisfaction in Hangzhou, China. The conceptual framework aims to examine the relationship between course content quality confirmation, reliability, responsiveness, empathy, course content quality, confirmation, perceived ease of use, and satisfaction of online learning. **Research design, data, and methodology**: 500 sample data was collected using the quantitative method and a questionnaire as a tool. Item-objective congruence and pilot tests were adopted to test the content validity and reliability of the questionnaire before distribution. Data was analyzed by utilizing Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM) to validate the model's goodness of fit and confirm the causal relationship among variables for hypothesis testing. **Results**: The results reveal that this conceptual model could predict which factors affect students' satisfaction with using e-learning in higher education in Hangzhou, China. Six out of seven proposed hypotheses were supported. Online learning satisfaction was strongly impacted by reliability, responsiveness, course content quality, confirmation, and perceived ease of use. **Conclusions**: This study recommends that developers of cloud-based e-learning systems in higher education institutions should concentrate on enhancing the quality factors of the systems. This will help students perceive the system as useful and increase their intention to continue using it.

Keywords : E-learning, Course Content Quality, Confirmation, Perceived Ease of Use, Satisfaction

JEL Classification Code: E44, F31, F37, G15

1. Introduction

The continuous development of network technology has led to the rise of online learning, which has several advantages over traditional offline learning. These include the ability to learn at any time and place, highly targeted content, high efficiency of online interaction, and repeatable learning. The COVID-19 pandemic since 2020 has further accelerated this trend. According to CNNIC's 48th Statistical Report on Internet Development in China, the number of online learning users in China reached 325 million as of June 2021, accounting for 32.1% of the total Internet users (China Internet Network Information Center, 2021). Online learning offers interactive forms, personalized content, and autonomy in learning, enabling individuals to explore infinite learning possibilities. Online learning is primarily based on network information technology. The core concept is curriculum reform, with wireless internet as the medium, network systems as the platform, electronic devices as tools, and online course content as the means to implement teaching plans. It provides personalized, user-centered, open-sharing, and timely interactive learning environments and methods that support and enhance users' learning processes in different environments. This stimulates students' interests and improves learning outcomes. The approach is suitable for all stages of learning. The integration of education and technology has become increasingly significant. As a significant result of 'Internet + education,' online learning is expected to reform the teaching mode, improve the fairness of education, and implement the concept of lifelong learning. The Horizon 2020 Report lists online education as one of the 15 most important trends (China Internet Network

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Information Center, 2020).

To provide a comprehensive theoretical basis for understanding quality evaluation in the field of learners' continuance intention of online learning, the research model extending the expectation-confirmation model (ECM) with the views of learning engagement and DeLone and McLean IS success model can be proposed to examine quality antecedents of learners' continuance intention of online learning. Hence, it is expected that an integrated model can be proposed in this study by introducing quality factors affecting student satisfaction in higher education to use e-learning in Hangzhou, China.

2. Literature Review

2.1 Course Content Quality

Course content quality is a commonly used standard for measuring the quality of web-based lessons (Lee, 2006). It refers to the quality of study materials generated by electronic learning systems (Cheng, 2020), including the substance's fertility and the law-likeness of renewal (Lee, 2006). Roca et al. (2006) suggest that course content quality is a pivotal prerequisite for students' satisfaction with the learning platform. The quality of online courses is an important determining factor for learners when choosing and continuing their education, highlighting the key role of course quality (Cheng, 2020). Cheng's (2020) research demonstrates that students' perception of course content and curriculum development affect their usefulness, confirmation, and satisfaction with online learning systems. This, in turn, influences their intention to continue using the system. If the course content on the online learning platform is regularly updated and comprehensive, it will meet the needs of students and make it easier for them to understand and appreciate the online learning system (Lee, 2006; Liu et al., 2010). Good course content quality can also positively impact reversing negative emotions in online courses (Ma et al., 2023). Geng et al. (2020) used various natural language processing technologies to analyze e-learning. They found that active moods were mainly expressed towards teachers and systems, while students tended to hold negative moods about the quality of course content. They found that active moods were mainly expressed towards teachers and systems, while students tended to hold negative moods about the quality of course content. They found that active moods were mainly expressed towards teachers and systems, while students tended to hold negative moods about the quality of course content. The quality of curriculum design is an important factor in judging the quality of course content (Lee et al., 2009). Therefore, the research suggests that the quality of online education courses significantly affects the confirmation of learners' expectations. Therefore, the researchers made the following hypothesis:

H1: Course content quality has a significant impact on confirmation of online learning.

H5: Course content quality has a significant impact on satisfaction of online learning.

2.2 Reliability

Reliability pertains to the probability of a system, device, or component operating successfully under specified time, environmental, and operating conditions (Düpow & Blount, 1997). It is the likelihood of a system performing expected functions within set limitations (Chinnaiyan & Somasundaram, 2010). Reliability also refers to the agreement of the measurement (Yvonne et al., 2011). It is inversely proportional to the occurrence rate of faults, meaning that higher reliability leads to lower failure rates (Straub et al., 2020; Wolstenholme, 1999). Reliability is the degree to which a system or product can perform its intended function without failure. Reliability helps to identify uncertainty variables that affect a system or product's function, enabling informed decisions (Liu et al., 2021; Ugurlu & Kumral, 2020). Reliability analysis involves using numerical data to express the uncertainty of project progress and budget overrun and to assess the probability of project failure (Ghodoosi et al., 2021). High reliability ensures the safe and orderly operation of products or services. Many organizations strive for high stability performance, equivalent to having critical assets. This performance allows the institutional framework to approach goals without errors (Milosevic et al., 2018). High reliability is a significant advantage as it ensures that the organization maintains high safety standards and can maintain a long-term security log (Bourrier, 2011). Reliability performance is crucial in all aspects of an organization as it helps to avoid potential hazards and ensures safe and smooth operations. It refers to an organization's ability to take precautions against accidents and hazards (Milosevic et al., 2018). Therefore, to prove the above research viewpoint, the researchers made the following hypothesis:

H2: Reliability has a significant impact on satisfaction of online learning.

2.3 Responsiveness

Responsiveness refers to the ability to quickly and effectively respond to customer needs and market changes within an appropriate framework to sustain competitive advantage (Kritchanchai & MacCarthy, 1999). According to Nigel Slack (2010), responsiveness is a hierarchical structure based on various flexibilities derived from flexible labor, flexible supplier processes, and technological flexibility.

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Responsiveness refers to the ability of a production platform or institutional framework to promptly respond to subscriber needs in the market (Holweg & Pil, 2001). The notion of responsiveness is based on various discussions on flexibility, as Lowson et al. (1999) pointed out. Stalk and Hout (1990) study demonstrates that companies have achieved positive results by focusing on improving responsiveness. This passage discusses the importance of responsiveness in a competitive environment. However, it is important to note that high responsiveness should only be reserved for the most important customers. Azzone et al. (1991) suggest high responsiveness can increase customer loyalty, perceived value, and product/service differentiation. Improving responsiveness can provide a competitive advantage, leading to higher prices and increased market share. Cognitive responsiveness, along with a psychologically secure communication atmosphere and ego effect, significantly impact students and can promote their continued integration into the online learning environment (Zhang et al., 2012). Therefore, to prove the above research viewpoint, the researchers made the following hypothesis:

H3: Responsiveness has a significant impact on satisfaction of online learning.

2.4 Empathy

Empathy was coined by psychologist Titchener (1909) (Wispe, 1986). In a research study, Wilson (2011) defined Empathy as the ability to place oneself in another person's shoes and understand their reactions by distancing oneself from one's reactions. Empathy learning is a powerful way for students to gain new understanding. According to Galinsky and Moskowitz (2000), students communicate and interact with individuals in need, establish emotional connections, and inspire these students to gain a new understanding of people and their needs. Kang et al. (2009) suggests that Empathy can be categorized into two extremes: negative and passive, which do not prompt any change in one's self or attitude towards others, and positive change, which involves positive self-reflection and a willingness to understand others by giving up one's worldview and way of thinking. Rogers (1961) argues that Empathy requires the emotional ability to comprehend others' worlds, but that does not mean we should treat other people's emotions as our own. Empathy is the ability to put oneself in the emotional shoes of others. Individuals with Empathy are not only skilled at perceiving the emotions of others but also capable of empathizing with and sharing them (Burch et al., 2016). Therefore, the researchers propose the following hypothesis to test whether Empathy affects satisfaction:

H4: Empathy has a significant impact on satisfaction of online learning.

2.5 Confirmation

Bhattacherjee (2001) study mentions that confirmation refers to users' perceptions of the consistency between their blog usage expectations and their real performance. Confirmation is identified as the degree to which subscribers recognize or sense in the process of practical use that their original expectations for a system or technology have been confirmed, affecting perceived usefulness and collectively affecting satisfaction, thereby affecting subscribers' willingness to continue an information system (Bhattacherjee, 2001). Confirmation refers to actively evaluating perceived performance (Kim, 2012). Lin and Wang (2012) used the IS success model as well as the fitting (TTF) model and the anticipation confirmation (ECM) model to investigate students' continued willingness to engage in blended teaching. The results showed that after students used the relevant learning system, the perceptual fitting of the system confirmed the system use. Yang (2015) takes MOOC users as the object and constructs a research model related to internal motivators, basic psychological needs, and MOOC design factors from the perspective of sustainable use and autonomy in the information system. The results show that anticipatory identification significantly affects cognitive effectiveness, satisfaction, and intrinsic motivation.

Moreover, it will indirectly affect how much users of MOOCs want to keep spending. Bai and Qian (2015), based on anticipatory verification (ECT), combines the two variables in social networks, interest and interaction, and puts them into the research environment. A conceptual model of continuous learning based on the network is established using a structural equation. Through the empirical test of this model, it can be seen that curriculum content, experience, and other factors significantly affect students' perceived satisfaction. The traditional effect of perceived satisfaction on continued use intention still exists, verifying the significant influence of utility and expectation confirmation on perceived satisfaction. Shiau and Chau (2012) pointed out in the study that expectations and confirmations immediately forecast subscribers' degree of satisfaction; expectations have a massive impact on the confirmation, while perceived performance has an initiative impact on confirmation. After using online learning, learners will continue to use it follow-up if they have a high degree of confirmation of the usefulness they have gained and are satisfied with it. Therefore, the research assumes that online learning satisfaction is affected by subscriber confirmation expectations. Hence, the researchers made the following hypothesis:

H6: Confirmation has a significant impact on satisfaction of online learning.

2.6 Perceived Ease of Use

Perceived ease of use refers to students' perception of

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how easy it is to use Internet services to achieve their study and research goals (Islam et al., 2020). Bajaj et al. (2021) similarly define perceived ease of use as the ease of studying or operating new technologies. Islam et al. (2020) highlight that perceived ease of use is crucial in determining educators' satisfaction with the application of technology in teaching. Perceived ease of use refers to the clarity and comprehensibility of interacting with the system, the simplicity with which the system can fulfill its requirements, the mental effort required to operate the system, and the ease with which the system can be operated (Ndubisi et al., 2003). According to a study by Islam et al. (2020), the ease of using wireless internet technology in college learning directly affects student satisfaction. Narad and Abdullah (2016) confirmed a causal relationship between perceived usefulness and ease of use. Users prefer to continue using a networked platform if they perceive it as easy to operate, making perceived ease of use a key factor in technology acceptance (Nikou, 2021). The perceived ease of use determines the consumer's continued focus on usage techniques (David & Aruta, 2022). It significantly impacts the willingness to continue, affecting the application of digital techniques in teaching practice (Sharma & Saini, 2022). Perceived ease of use also affects an individual's calculation of the workload involved in using technology (Ndubisi et al., 2003). Lin and Wang (2012) suggest that the quality of a system is a significant factor that can influence the perceived ease of use and usefulness of a service or product. According to technology acceptance modeling, perceived ease of use and usefulness are the two major factors influencing users' adoption of information technology (Zhou, 2011). Research has also shown that system quality significantly impacts perceived ease of use. Chen et al. (2019) study indicates that perceived ease of use may be affected by perceived pleasure.

Additionally, perceived ease of use has a greater impact on novices' behavioral intentions than experienced individuals (Ayeh et al., 2016; Celik, 2016). Therefore, the research assumes that online learning satisfaction is affected by perceived ease of use. Hence, the following hypothesis is proposed:

H7: Perceived ease of use has a significant impact on satisfaction of online learning.

2.7 Satisfaction

Satisfaction is a crucial aspect of service products. In the context of 'students as clients,' it is important to prioritize efforts to enhance student satisfaction (Small et al., 2012). Satisfaction is a subjective experience and a key factor in determining client satisfaction (Ashfaq et al., 2020; Deng et al., 2005). Kang et al. (2009) defined subscriber satisfaction as the extent of satisfaction or dissatisfaction experienced by information system subscribers when they achieve expected benefits from the system. Therefore, internal satisfaction with the system can encourage continued use. Cheng (2020) suggests that user satisfaction with the e-learning system is a key factor in their willingness to continue using it. Park and Kim (2003) argue that user satisfaction with information systems and technology depends on their expectations.

Small et al. (2012) researched educational satisfaction. They found that it is promoted by learners' abilities and objectives, quality of instruction, technology application in the classroom, and positive attitudes toward technology. Trust in the source's behavior has an active effect and ultimately improves satisfaction (Shen et al., 2023). An active information system can enhance consumer satisfaction and increase net profit. This is supported by research conducted by Bradford et al. (2020) and Bradford et al. (2020), which confirms that training can improve consumer satisfaction. Vatanasakdakul et al. (2020) also acknowledge the positive impact of training on consumer satisfaction. Al-Okaily et al. (2020) found that perceived usefulness can significantly influence customer satisfaction. Therefore, the project assumes that curriculum content quality is pivotal in online learning satisfaction.

3. Research Methods and Materials

3.1 Research Framework

The researcher has proposed the research model based on adopting the extended Technology Acceptance Model (TAM) and the updated DeLone and McLean successful models. TAM explains the acceptance and adoption of Information Systems (IS and analyzes the factors affecting users' adoption. It supports a theoretical foundation to understand the external factors that affect users' attitudes and intentions, which have been widely used to predict the usage of information technology. Drennan et al. (2005) mention that TAM was created to research technology acceptance in business environments, and it has been proven to be a simple model applicable for use in the context of education. The research model is also adopted from three theoretical frameworks of previous studies. The conceptual framework of this study is shown in Figure 1.

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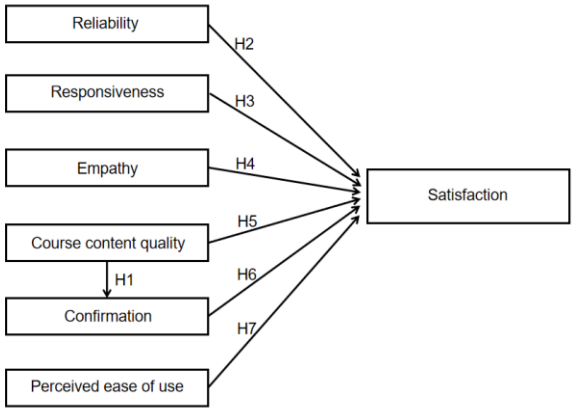

Figure 1: Conceptual Framework

H1: Course content quality has a significant impact on confirmation of online learning.
H2: Reliability has a significant impact on satisfaction of online learning.
H3: Responsiveness has a significant impact on satisfaction of online learning.
H4: Empathy has a significant impact on satisfaction of online learning.
H5: Course content quality has a significant impact on satisfaction of online learning.
H6: Confirmation has a significant impact on satisfaction of online learning.
H7: Perceived ease of use has a significant impact on satisfaction of online learning.

3.2 Research Methodology

In this study, empirical analysis and quantitative methods were adopted. Sample data were collected from the target population by using a questionnaire as a tool. Before large-scale data collection, the content validity and reliability of the questionnaire were verified through the Item-Objective Congruence (IOC) test and a pilot test of Cronbach's Alpha. In the pilot test with a sample size of 50, Cronbach's Alpha indicates that the items consistently measure the intended construct, thereby increasing the overall reliability of the test results. According to George and Mallery (2003), a Cronbach's Alpha score of 0.7 and above signifies sufficient reliability. After the reliability test, the questionnaires were distributed online to undergraduates, including six main subjects, and these subjects were both undergraduates. The respondents must have more than one year of online learning experience. Anderson and Gerbing (1988) proposed two steps of the Structural Equation Model (SEM) method, which was adopted in this study to analyze the sample data. The first step was using SPSS and AMOS for Confirmatory Factor Analysis (CFA) to examine convergent validity, and the second step was to conduct SEM to explore causal relationships between all constructs in the conceptual model to test the significance of influences and proposed hypotheses. SEM can explore a range of dependencies synchronously, especially when the model consists of direct and indirect influences between structures (Hair et al., 2010).

3.3 Population and Sample Size

In the research, the sample data for this study were collected from a convenience sample of 500 of six main subjects who were second-year students in 6 sub-colleges of Zhejiang Business College. All of whom had experience using online learning systems in Hangzhou, China. The study data from a structural equation modeling (SEM) technique was conducted to identify causal relationships. This is to ensure that participants are familiar with LMS and have interactive experience with LMS. Based on the A-priori Sample Size Calculator for SEM by Soper (2006), the recommended minimum sample size was 425 from the parameters of 7 latent variables and 28 observed variables at the probability level 0.05. Therefore, the questionnaires are distributed and screened for valid responses at 500.

3.4 Sampling Technique

The sample was scoped and selected using the multistage sampling techniques of judgment, stratified random, and convenient sampling. Judgment sampling was adopted to select six main subjects of second-year students in 6 sub-colleges of Zhejiang Business College. Then, stratified random sampling was used to determine the sample size from each institution or sample stratum, as shown in Table 1.

Table 1: Sample Units and Sample Size

Six Main Subjects	Population Size	Proportional Sample Size
Electronic Commerce	1200	114
Accounting	955	91
Science and Technology	850	81
Tourism Service	833	80
Marketing	809	77
Art	601	57
Total	**5248**	**500**

Source: Constructed by author

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4. Results and Discussion

4.1 Demographic Information

The demographic profile of 500 respondents is presented in Table 2. The respondents are 278 females and 222 males, representing 55.6% and 44.4%, respectively.

Table 2: Demographic Profile

Demographic and General Data (N=500)		Frequency	Percentage
Gender	Male	222	44.4%
	Female	278	55.6%

4.2 Confirmatory Factor Analysis (CFA)

Confirmatory factor analysis (CFA) is a key starting point in the SEM (Hair et al., 2010). Both variables' reliability and validity can be measured with CFA (Byrne, 2010). Convergent validity can be statistically measured by Cronbach's Alpha reliability, factor loading, average variance extracted (AVE), and composite reliability (CR) (Fornell & Larcker, 1981). Factor loading above 0.50 is significant (Hair et al., 1998). In this study, the factor loading of all individual items was greater than 0.50 and mostly was above 0.75, ranging from 0.436 to 0.867, as presented in Table 3. Composite reliability (CR) was recommended at the value of 0.8 or above, and average variance extracted (AVE) was recommended at greater than or at 0.4 (Fornell & Larcker, 1981; Hair et al., 1998). In Table 3, almost all estimates were significant as CR values exceeded the level of 0.7 and AVE values exceeded 0.4. Cronbach's alpha was a technique applied to evaluate the items' internal consistency in construct (Killingsworth et al., 2016). The value of Cronbach's alpha should be at 0.7 or higher to indicate acceptable reliability (George & Mallery, 2003; Hair et al., 2010). All Cronbach's Alpha values exceeded 0.7 as per table 3.

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
Reliability (REL)	Düpow and Blount (1997)	4	0.796	0.436-0.812	0.804	0.518
Responsiveness (RES)	Kritchanchai and MacCarthy (1999)	5	0.814	0.529-0.820	0.815	0.476
Empathy (EMP)	Wiggins and McTighe (2005)	4	0.838	0.708-0.805	0.839	0.566
Course content quality (CCQ)	Cheng (2020)	3	0.855	0.803-0.854	0.865	0.681
Perceived ease of use (PEU)	Islam et al. (2018)	3	0.864	0.774-0.867	0.856	0.665
Confirmation (CON)	Kim (2012)	3	0.806	0.735-0.794	0.806	0.581
Satisfaction (SAT)	Bowden-Everson et al. (2013)	6	0.849	0.581-0.798	0.842	0.476

Indicators of Goodness of fit were measured in Table 4. In Table 4, the indices used for measurement were CMIN/DF, GFI, AGFI, NFI, CFI, TLI, and RMSEA; the statistical values were CMIN/DF = 1.972, GFI = 0.908, AGFI = 0.887, NFI = 0.894, CFI = 0.944, TLI = 0.936, and RMSEA = 0.044, which all statistical values from CFA were greater than acceptable values and proven goodness of fit for measurement model.

Table 4: Goodness of Fit for Measurement Model

Fit Index	Acceptable Criteria	Statistical Values
CMIN/DF	< 5.00 (Al-Mamary & Shamsuddin, 2015; Awang, 2012)	648.858/329 or 1.972
GFI	≥ 0.85 (Sica & Ghisi, 2007)	0.908
AGFI	≥ 0.80 (Sica & Ghisi, 2007)	0.887
NFI	≥ 0.80 (Wu & Wang, 2006)	0.894
CFI	≥ 0.80 (Bentler, 1990)	0.944
TLI	≥ 0.80 (Sharma et al., 2005)	0.936
RMSEA	< 0.08 (Pedroso et al., 2016)	0.044
Model Summary		**Acceptable Model Fit**

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

Discriminant validity appeared satisfactory in Table 5. All variables were significant from the greater value of AVE square roots compared to the factor correlations.

Table 5: Discriminant Validity

	REL	RES	EMP	CCQ	PEU	CON	SAT
REL	**0.720**						
RES	0.182	**0.690**					
EMP	0.052	0.008	**0.752**				
CCQ	0.188	0.263	0.070	**0.825**			
PEU	0.211	0.150	-0.002	0.169	**0.815**		
CON	0.061	0.167	0.022	0.198	0.208	**0.762**	
SAT	0.303	0.271	0.074	0.309	0.308	0.327	**0.690**

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

4.3 Structural Equation Model (SEM)

This study adopted a Structural Equation Model (SEM) to analyze the collected data. The strengths of SEM include various aspects. SEM could explore dependent relationships (Hair et al., 2010). Secondly, SEM examined the causal relationships among latent and observed variables. Third, random error in the observed variables was used to provide more accurate measurement results. Fourth, it used multiple

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indicators to measure latent variables. Lastly, it could also test hypotheses at the construct level, not only at the item level (Hoyle, 2011). The goodness of fit for the structural model was measured and demonstrated in Table 5 and Figure 3. The statistical values were CMIN/DF = 2.281, GFI = 0.889, AGFI = 0.869, NFI = 0.872, CFI = 0.924, TLI = 0.916, and RMSEA = 0.051. All values from fit indices were greater than the acceptable values, so they affirmed the model fitness.

Table 6: Goodness of Fit for Structural Model

Fit Index	Acceptable Criteria	Statistical Values
CMIN/DF	< 5.00 (Al-Mamary & Shamsuddin, 2015; Awang, 2012)	782.506/343 or 2.281
GFI	≥ 0.85 (Sica & Ghisi, 2007)	0.889
AGFI	≥ 0.80 (Sica & Ghisi, 2007)	0.869
NFI	≥ 0.80 (Wu & Wang, 2006)	0.872
CFI	≥ 0.80 (Bentler, 1990)	0.924
TLI	≥ 0.80 (Sharma et al., 2005)	0.916
RMSEA	< 0.08 (Pedroso et al., 2016)	0.051
Model Summary		**Acceptable Model Fit**

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 correlation magnitude among the independent and dependent variables proposed in the hypothesis is measured by regression coefficients or standardized path coefficients.

Table 7: Hypothesis Results of the Structural Equation Modeling

Hypothesis	(β)	t-value	Result
H1: CCQ→CON	0.239	4.425*	Supported
H2: REL→SAT	0.276	5.665*	Supported
H3: RES→SAT	0.196	4.103*	Supported
H4: EMP→SAT	0.054	1.160	Not Supported
H5: CCQ→SAT	0.196	4.029*	Supported
H6: CON→SAT	0.293	5.634*	Supported
H7: PEU→SAT	0.240	5.048*	Supported

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

As presented in Table 7, six proposed hypotheses were supported. The satisfaction of online learning was strongly impacted by reliability, responsiveness, course content quality, confirmation, and perceived ease of use. The confirmation of online learning was significantly driven by course content quality. The path relationship of course content quality and confirmation of online learning has a standardized path coefficient of 0.239 and a t value of 4.425 in H1; course content quality significantly impacts confirmation of online learning. The relationship between reliability and satisfaction with online learning has a standardized path coefficient of 0.276 and a t value of 5.665 in H2; reliability significantly impacts satisfaction with online learning. The relationship between responsiveness and satisfaction with online learning has a standardized path coefficient of 0.196 and a t value of 4.103 in H3; responsiveness significantly impacts satisfaction with online learning. The path relationship between empathy and satisfaction with online learning has a standardized path coefficient of 0.054 and a t value of 1.160 in H4; empathy has no significant impact on satisfaction with online learning. The relationship between course content quality and satisfaction with online learning has a standardized path coefficient of 0.196 and a t value of 4.029 in H5; course content quality significantly impacts satisfaction with online learning. The path relationship of confirmation and satisfaction with online learning has a standardized path coefficient of 0.293 and a t value of 5.634 in H6; confirmation significantly impacts satisfaction with online learning. The relationship between perceived ease of use and satisfaction with online learning has a standardized path coefficient of 0.240 and a t value of 5.048 in H7; perceived ease of use significantly impacts satisfaction with online learning.

5. Conclusion and Recommendation

5.1 Conclusion and Discussion

This study aimed to comprehensively analyze factors affecting students' satisfaction with e-learning in higher education in Hangzhou, China. The researcher proposed seven hypotheses in the conceptual framework to investigate the factor's impact on the number of second-year students. After the questionnaire was prepared and verified reliable, the questionnaire was distributed online to undergraduates, including six (Electronic et al., Tourism Services, Marketing, and Art) main subjects of second-year students in 6 sub-colleges of ZJBC; there are a lot of student's study in these subjects. With the collected data, CFA was adopted to measure and test the validity and reliability of the research conceptual model. SEM was also employed to analyze and discuss the factors influencing satisfaction among Chinese undergraduate students in online learning. Six out of seven hypotheses proposed were supported and proven to fulfill research objectives. The findings of this research can be summarized as follows: The results reveal that this conceptual model was able to predict which factors influence satisfaction among Chinese undergraduate students in online

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learning. Online learning satisfaction was strongly impacted by reliability, responsiveness, course content quality, confirmation, and perceived ease of use. The confirmation of online learning was significantly driven by course content quality. Therefore, this study suggested that developers of the cloud-based e-learning systems of higher education institutions should focus on improving the quality factors of the cloud-based e-learning systems for students to perceive the system as useful and would further enhance the cloud-based e-learning systems, perceived usefulness, and continuance intention toward using the cloud-based e-learning systems.

5.2 Recommendation

On the one hand, in this study, the satisfaction of online learning was the strongest predictor of continuance intention to use both directly and indirectly, which the satisfaction of online learning was driven significantly by course content quality, reliability, responsiveness, course content quality, confirmation, and perceived ease of use. Many students choose e-learning because the course content quality, reliability, responsiveness, course content quality, confirmation, and perceived ease of use influence them. Therefore, the teaching unit of the university should fully enhance the e-learning course content quality, reliability, responsiveness, course content quality, confirmation, and perceived ease of use to encourage more students to accept this e-learning platform. On the other hand, online learning satisfaction was the strongest predictor of continuance intention to use both directly and indirectly. In this research, students' satisfaction is affected by six latent variables, of which the most influential is confirmation. Therefore, in future teaching practice, the teaching units should focus on the reliability of e-learning as some scholars' research on the relationship between reliability and satisfaction of online learning proves that students' expectation of the learning system will determine their learning satisfaction (Lee, 2010; Lin & Wang, 2012). Therefore, this recommendation shall effectively enhance students' positive attitude towards the college students' e-learning satisfaction and continuance intention.

5.3 Limitation and Further Study

This study should acknowledge several limitations, and the interesting avenues for further research will be worth future efforts in this field. First, the limitation of this study is that the target population included only students from six main subjects of second-year students in 6 sub-colleges of Zhejiang Business College. Moreover, only a few popular majors were selected for quantitative analysis. Further exploration can take place in two parts. Next, the data in this study was collected from one educational institution in Zhejiang Province or other regions of China. Given this study's limited scope, further research may generalize this study's sample to respondents of other national backgrounds and conduct cross-country comparisons to enhance the study's completeness. Finally, this study's results were based on cross-sectional data. Further research may utilize a longitudinal analysis by considering the evolution of students' online learning continuance intention over time. The investigation can consider other latent variables, such as behavioral intention, social influence, self-efficacy, effort expectancy, trust, perceived interaction, learning motivation, performance expectancy, and facilitating conditions, to extend the research framework on the conceptual structure of student satisfaction with online learning.

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