pISSN: 1906 - 3296 © 2020 AU-GSB e-Journal.
eISSN: 2773 – 868x © 2021 AU-GSB e-Journal.
https://assumptionjournal.au.edu/index.php/AU-GSB

# The Impacting Factors of Satisfaction and Continuous Intention Towards Online Learning of Student in Senior Year in Chengdu, China

**Dong Wang***

**Received: Frebuary 21, 2024. Revised: June 6, 2024. Accepted: February 22, 2025.**

## Abstract

**Purpose:** Factors impacting Chinese college students' online learning satisfaction and online continuous learning intention take senior students from four universities in Chengdu as an example. **Research Design, Data, and Methodology:** Quantitative methods and questionnaires were used to collect sample data of 500 students in their senior year. Item-objective congruence and pilot tests were adopted to test the questionnaire's content validity and reliability before distribution. The data was analyzed using Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM) to validate the model's goodness of fit and confirm the causal relationships among variables for hypothesis testing. **Results:** The results are that students' satisfaction with online learning significantly affects students' willingness to continue online learning. Students' online learning satisfaction is affected by the quality of information, instructor, system and course website. Students' satisfaction with online learning is the significant predictor of their willingness to continue learning online. It is important to note that the quality of information and the quality of teachers can have a significant impact on student satisfaction with online learning. **Conclusions:** In general, during the COVID-19 epidemic in 2019, it is important to explore online education in higher education, especially for senior college students who are faced with employment and postgraduate entrance examinations for further study.

**Keywords:** Information Quality, Instructor Quality, Course Website Quality, Continuous Intention, Satisfaction

**JEL Classification Code:** E44, F31, F37, G15

## 1. Introduction

Online education in China utilizes the internet and information technology to provide educational content for various levels of education, including preschool and adult education. This mode of education offers students the opportunity to receive necessary education in a shorter time frame, without traditional education's time and space limitations. It has become increasingly popular in recent years due to the rapid development of the online education industry. However, it is worth noting that the quality of online education platforms can vary (Jiang et al., 2023). One of the main advantages of online education is the ability to access knowledge regardless of location or time. Users can learn through mobile phones, PDAs, and other mobile devices. In 2023, China's top ten online education brands include New Oriental Online, Hujiang Online School, Aopeng Education, Chalk Vocational Education, Zhengbao Accounting Online School, Xueershi Online School, Zhongpublic Network School, Gao Tu, Huatu Online, and Youdao Excellent Course. The list of top ten online courses and famous online courses includes those with a good reputation, high visibility, and strength, ranked in no particular order. In addition, various online learning platforms are available, including the MOOC network, Xuetang Online, Khan Academy, NetEase Open Class, and NetEase Cloud Class. According to a report by Xinhua Net, approximately 270 million students in China have enrolled in online education programs. The report also highlights that daily users on various platforms have exceeded 10 million

1*Dong Wang, School of Fine Arts and Design, Chengdu University, China.
Email: 54436576@qq.com

(Gautam, 2020).

The industry's growth can be attributed to the rise of the internet and the impact of the COVID-19 pandemic since January 2020. It is worth noting that the COVID-19 virus is highly contagious and poses a significant threat to the population. To tackle the epidemic control and prevention issue, China's Ministry of Education has introduced a new approach called 'school suspension without suspending school.' With the rapid growth and popularity of cloud computing and intelligent terminals, online learning has become more diverse. It started with distance education in the 1990s, followed by MOOC in 2012, and now includes smart classrooms. An increasing number of universities are incorporating online learning to supplement traditional teaching (Jiang et al., 2023).

Additionally, many universities offer open online courses for students to learn (Zhang, 2019). Chinese MOOC platforms have been launched by universities such as Beijing, Tsinghua University, and Shanghai Jiaotong University. Xuetang Online, for example, has over 4 million registered users. According to Professor Li Manli, head of MOOC research and development at Tsinghua University, online learning has attracted unprecedented global attention and rapid action. However, it also has several drawbacks, such as the need for more interaction between teachers and students, which can make it challenging to develop a personalized learning program that supports diverse learners. In addition to managing information, teachers require computer literacy skills to use learning management systems effectively. While implementing a cost-effective learning management system is important, it is crucial to consider project circumstances that impact success, such as resource availability and facilities.

Furthermore, internet-based learning is unavoidable. However, if not properly regulated, it can lead to time wastage, fragmented information, and a negative impact on one's mood and mental health, which can affect physical health and normal learning. Additionally, prolonged internet use can adversely affect the skin and eyes. It can lead to a lack of emotional connection with family members, ultimately affecting family harmony and work productivity. It is important to note that there are numerous examples of internet-related violence. The power of language should not be underestimated, as it can cause harm even without physical force. Unfortunately, the internet is rife with examples of such harm, including spreading rumors, conducting human flesh searches, and provoking online conflicts. These actions can damage the reputation, health, and even the safety of others (Ren & Xu, 2021).

Electronic learning is often recommended due to its cost-effectiveness and ability to provide unlimited space and time. Ngai et al. (2007) define e-learning systems as electronic media, such as the internet, extension net, and internal networks. Online learning is a widely regarded and effective education method that users can access worldwide. The number of institutions and learners utilizing online learning in higher education has significantly increased in recent years. This learning method offers various teaching methods, including flipped and blended classrooms, which can help improve the quality of training available to students. It has become an integral part of higher education due to its convenience and accessibility. Online learning is becoming increasingly popular in universities inside and outside the classroom. According to Edutechnica, over 500 educational institutions have over 500 students enrolled in online courses. The number of students and teachers using online learning in higher education has significantly increased, particularly in enterprise training. Online education has expanded in higher education due to its convenience and flexibility. These factors have influenced students' decisions to enroll in traditional schools or universities.

Additionally, the learning process has evolved to accommodate the increasing number of people interested in learning beyond books. In China, the traditional teaching method has existed for thousands of years. However, the rapid emergence of new teaching tools and methods has led to implementing learning-centered teaching. Additionally, online learning has become increasingly popular, particularly due to the HIV/AIDS epidemic, which has resulted in more people using this method. Many universities have used online learning to analyze and improve student learning outcomes. It can also generate reports and indicators, such as course completion rates and degree completions, to help institutions make informed decisions and strategies. There are various definitions of e-learning. Decman (2015) defined e-learning as delivering knowledge and educational content through digital media. In 2002, China presented a prominent example of e-learning. This new learning style allows teachers to modify their teaching methods and enhance the teacher-student relationship through modern technology. OpenAI developed ChatGPT, a chatbot capable of enhancing its intelligence and diversifying its abilities. Its performance has been widely debated and has brought forth various marvels. The impact of online education has been acknowledged as a revolutionary advancement.

The government has implemented several measures in response to the Covid-19 crisis, including publishing policies on quarantine and social distancing. The epidemic has had an unprecedented impact on both the psychological and economic sectors. To prevent the spread of the disease, many people have been staying at home, which has affected the livelihoods of individuals and students. Technology's rapid emergence and evolution have greatly affected various aspects of life. While online learning has helped with everyday tasks, such as promoting traditional learning methods, it has also presented challenges for schools.

According to a 2020 report by UNESCO, the pandemic has affected over 1.7 billion students worldwide. Online learning has become increasingly popular due to the pandemic, with many schools adopting it as a means of teaching and learning. In August, a report from the US Department of Education revealed that over 62,000 international students participated in a survey about the increasing number of online students. The report indicated a shift in attitudes towards online learning. In January 2020, COVID-19 swept the world, and due to its high contagion rate, the population became highly susceptible to the virus. "School suspension without school suspension" is a new measure implemented by the Ministry of Education of China to cope with epidemic prevention and control (Ren & Xu, 2021). The evaluation subjects are constantly changing, and the quality of online courses is now measured mainly by "student-centered" comments, such as the degree of student satisfaction. Due to the time and space difference between students and teachers, those who take online courses may feel isolated and lonely. Studies have shown that students' interactions with teachers can greatly influence their satisfaction and learning outcomes (Gao, 2021).

## 2. Literature Review

### 2.1 Information Quality

Information quality is a multidimensional concept encompassing the information system output's precision, integrity, and format (Nelson et al., 2005). Additionally, information quality is often associated with the quality of content-based online services (Lin & Johnson, 2015). Van Birgelen et al. (2008) identified relevance, accuracy, and timeliness as key dimensions for measuring information systems. Information technology uses equipment and methods to obtain, transform, display, transmit, and store numerical, textual, sound, and image information. It involves providing services and equipment to support communication and computer technology. The quality of information technology is linked to the digital devices that students use for learning (Clark & Mayer, 2003). According to Lin et al. (2012), information quality is the ability of a system to convey information intention. Digital technology has improved students' learning experience and environment (Rapanta et al., 2020). Research examples (Alkhalaf et al., 2015) demonstrate that higher-quality e-information delivery correlates with better e-learning performance. Online education relies heavily on information technology and learning-related information systems, such as learning management, video teaching, and online evaluation systems. These are significant investments for educational institutions. Therefore, the ability of learners to continue using these information systems for learning over an extended period is directly linked to their behavior in maintaining online learning. This, in turn, determines the return on investment of online education institutions (Tan, 2015). TRA and TAM are commonly used to explain users' initial behavior after their first contact with new information technology rather than focusing on their later continuous use behavior after adoption. The user's later continuous use behavior is critical to successfully applying information technology or information systems. Cao et al. (2005) noted that previous studies had recognized the significance of information quality to the effectiveness and success of information technology. Lin (2007) found that the success of the intrinsic determinant of a virtual community was the information quality of a social networking system. Therefore, information quality is the most useful factor. According to Lin and Lu's (2000) study, users' perception of system usefulness was influenced by various factors.

Lin (2007) research found that the perceived usefulness of virtual communities was particularly affected by the quality of information provided. This quality was mainly determined by the content of online features, while system quality and quality of service focused on the function provided by online features (Lin, 2007). Rotchanakitumnuai and Speece (2004) demonstrated that customers' perception of information quality can determine the usefulness of electronic services. Additionally, DeLone and McLean (2003) identified service, system, and information quality as crucial online quality factors that are key to evaluating exceptional information systems. According to Lin and Lu (2000), information quality was a forecasted factor in determining perceived usefulness.

The significance of information quality on perceived effectiveness has been noted by Lin (2007). Customers only consider information quality useful when they perceive the information on the site to be accurate, well-informed, and up-to-date (Perkowitz & Etzioni, 1999). Therefore, the following hypothesis has been formulated based on these studies:

**H1:** Information quality has a significant impact on online learning satisfaction.

### 2.2 *System Quality*

According to Selwyn (2007), integrating a learning management system with a virtual environment can enhance student satisfaction. The online learning platform's quality of information and service are key factors influencing student behavior. Ho et al. conducted a study that found that student satisfaction indicates system quality. If the platform's service does not meet the students' expectations, it may cause dissatisfaction. To prevent such issues, universities usually invest heavily in technology to enhance the quality of their

learning systems and ensure student satisfaction (Naveh et al., 2012). Previous studies have emphasized the significance of system quality, particularly in virtual web commerce environments (Ahn et al., 2007; Teo et al., 2003).

Previous studies have shown that system quality can significantly impact user satisfaction (Rai et al., 2002).

Using functional groups and navigational aids in a virtual environment, supported by a high-quality website, enables effective customer information exchange. Therefore, system quality has a positive impact. This hypothesis is based on studies supporting perceived usefulness (Kim et al., 2008). Based on these studies, the following hypothesis has been formulated:

**H2:** System quality has a significant impact on online learning satisfaction.

## 2.3 Course Website Quality

The online teaching module utilizes the free group Weaves dynamic modular design to implement blended learning effectively (Shin, 2009). With the continuous development of network technology, networks are playing an increasingly important role in all fields of society, including education. Various forms of network-based teaching are being researched and used more frequently, particularly the network teaching platform, which has seen significant development and application. More and more teachers are using networks to create course websites and expand their teaching into cyberspace.

The study analyzed the correlation between online shoppers' satisfaction and service quality. The results showed a positive correlation between the two factors. Furthermore, Bai et al. (2008) conducted a study that revealed that website quality significantly contributes to customer satisfaction. Their survey found no difference in satisfaction between online and traditional classroom learning. Toffler (1970) suggests that the future of education should focus on community-based, homeschooling, small class sizes, and multiple teachers, emphasizing online and multimedia education. In his 1970 book 'Future Shock,' the author discusses education for the future, focusing on cultivating students' ability to adapt to new environments, make sound judgments, and identify new relationships in a changing environment. The author emphasizes the importance of developing generic skills that can be applied in future environments. Recent technological advancements, including the rise of artificial intelligence and the Internet of Things, have made the development of online courses and educational information more feasible. Based on these studies, the following hypothesis has been formulated:

**H3:** Course website quality has a significant impact on online learning satisfaction.

## 2.4 Instructor Quality

In the university, teachers play a crucial role as the bridge between students and the institution. They facilitate social communication and the adoption of technology acceptance model techniques. According to Badia et al. (2019), the quality of instructors and course materials can impact student satisfaction with e-learning. This tool assists students in evaluating and assessing the effectiveness of their online learning environment and developing effective discussion and learning activities (Al-Fraihat et al., 2020; Zhai & Shi, 2020).

Teaching technology refers to the various media and conditions college teachers use to transmit teaching information. It can be divided into conventional and modern teaching methods. Conventional methods include intuitive teaching instruments often used in classroom teaching, such as chalk, blackboard, pointer, and other teaching aids. Visual aids commonly used in teaching include charts, blackboard drawings, objects, specimens, and models. Modern teaching methods refer to various tools that use science and technology to transmit information. The teaching facilities encompass both hardware and software tools. The hardware facilities include a slide projector, film machine, television set, tape recorder, video recorder, language laboratory, program teaching machine, and electronic computer. The software tools include slides, video films, audio tapes, floppy disks, and CDs, which carry teaching information. Modern teaching tools are primarily audio-visual aids. They provide more information and display richer, more vivid images than traditional technical means. They effectively supplement students' direct knowledge and experience. Based on these studies, the following hypothesis has been formulated:

**H4:** Instructor quality has a significant impact on online learning satisfaction.

## 2.5 Reliability

Zeithaml and Bitner (2003) define reliability as executing security services faithfully and perfectly. In the context of colleges and universities, reliability refers to fulfilling agreements and commitments and providing services such as fee processing and evaluation. Students expect a transparent relationship with the institution and rely on it to maintain its commitment to service outcomes and core attributes that reflect student satisfaction. Therefore, students consider reliability as a crucial dimension for evaluating their satisfaction. The team of teachers who cater to student needs is excellent, compassionate, knowledgeable, and responsive. However, students value the ability to perform services accurately the most, ensuring reliable student satisfaction. According to Grönroos (2001), reliability is a crucial factor for customer satisfaction and their trust in the service system

created by the company and its employees. It is also the most important element when evaluating a service. Reliability is crucial for improving customer satisfaction. This involves fulfilling commitments such as scheduling, completing tasks on time, and ensuring satisfactory results. According to Quang et al. (2017), reliability means being trustworthy, accurate, and proactive in delivering on promises. Based on these studies, the following hypothesis has been formulated:
**H5:** Reliability has a significant impact on online learning satisfaction.

### 2.6 Online Learning Satisfaction

In online learning, colleges and universities should strive to solve students' online learning difficulties. Students today face various problems with social interaction, such as peer discussions, practical experimental meetings, face-to-face learning opportunities, etc. According to Strong et al. (2012), student satisfaction is a vital factor that can be considered when assessing the success of e-learning projects.

Meanwhile, Cole et al. (2014) noted that student satisfaction is vital to improving learning outcomes in online courses. Students' satisfaction with e-learning systems is a vital factor that policymakers and instructional materials must consider. This is because it influences the decision-making process of learners when it comes to adopting such systems (Pham et al., 2019). Therefore, this study studies online learning satisfaction from five aspects: Information quality, system quality, course website quality, instructor quality, and reliability. Based on these studies, the following hypothesis has been formulated:
**H6:** Online learning satisfaction has a significant impact on online learning continuous intention.

### 2.7 Online Learning Continuous Intention

The goal of continuing education online is also affected by how satisfied students are with their learning experiences. Numerous studies have shown that service quality can affect students' satisfaction with their education. Guo et al. (2023) studied the social factors that influence learners' continuous intention to learn online from the perspective of the existence of a society. They mainly analyzed the influence of co-existence, immersion, interaction, and intimate relationships on online learning satisfaction, thus influencing online learning persistence intention. Bhattacherjee (2001) is convinced that users' continuous use of information systems is like repeated consumer purchases. Therefore, satisfaction is considered an antecedent variable affecting the continuum of participation behavior (Tsai et al., 2011). Kuo et al. (2014) found students' satisfaction and performance, including students' grades in online courses.

## 3. Research Methods and Materials

### 3.1 Research Framework

The study examined six variable relationships. The initial relationship is between system quality and satisfaction with online learning. System quality is the external variable, while online learning satisfaction is the internal variable. The second relationship is between information quality and satisfaction with online learning. The variables impacting information quality and online learning satisfaction can be categorized as internal or external. The correlation between online course quality and satisfaction with online learning is crucial. Finally, it is important to consider the correlation between reliability and satisfaction with online learning. Online course quality is an exogenous variable, while satisfaction with online learning is an endogenous variable.
The correlation between teacher quality and satisfaction with online learning should also be considered. The final relationship is the correlation between satisfaction with online learning and intentions for continuous learning. Online learning satisfaction is the independent variable, while continuous learning intention is the dependent variable.

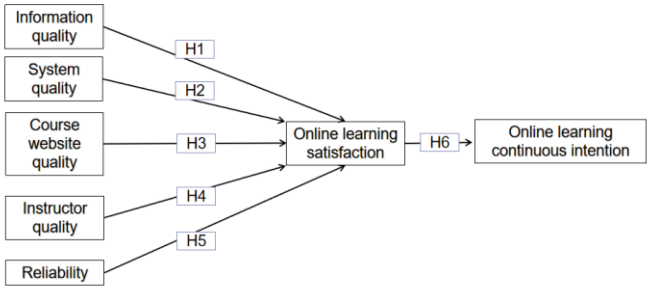


**Figure 1:** Conceptual Framework

**H1:** Information quality has a significant impact on online learning satisfaction.
**H2:** System quality has a significant impact on online learning satisfaction.
**H3:** Course website quality has a significant impact on online learning satisfaction.
**H4:** Instructor quality has a significant impact on online learning satisfaction.
**H5:** Reliability has a significant impact on online learning satisfaction.
**H6:** Online learning satisfaction has a significant impact on online learning continuous intention.

### 3.2 Research Methodology

This chapter introduces the research methods and hypotheses of the researchers. This dissertation investigates the factors that affect online learning satisfaction and continuous intention of college students in Chengdu, China. The scope of this study includes the selection of the target population, sampling unit, sample size, and other research tools and methods. Quantitative methods were used to collect data on the target population. The researcher collected data on the target group using a questionnaire. The data collection process is described in detail.

Before data collection, the researchers ensured its validity by performing steps such as Item-Objective Congruence (IOC) and Cronbach's Alpha. The IOC was assessed by a panel of three experts, with all items exceeding the acceptable threshold of 0.6. In the pilot test, which included 50 participants, Cronbach's alpha reliability was utilized. According to Tavakol and Dennick (2011), a measurement tool is deemed appropriate for use if the Alpha coefficient is 0.70 or higher, indicating satisfactory structural quality.

After data collection, the relationship between variables was analyzed using the structural equation modeling program (SEM). This study covers eight aspects. This text describes the research methods, including the steps in data collection, sampling procedures, research tools, and questionnaires. The language is clear, objective, and value-neutral, with a formal register and precise word choice. The text adheres to a conventional structure, with common academic sections and consistent formatting features. Causal connections between statements are established, and the text is free from grammatical, spelling, and punctuation errors. The data collection process is summarised, including internal consistency and validity checks, model fit analysis, confirmation factor analysis (CFA), and structural equation modeling (SEM).

### 3.3 Population and Sample Size

Raza and Hanif (2013) aim to determine the appropriate sample size for their research. The literature presents various views on the scope of the study. Tabachnick and Fidell (2007) recommend a sample size of 300 to 400, while Hair et al. suggest a more modest figure of 100. A sample size of approximately 150 to 200 respondents is reasonable. Herzog and Boomsma (2009) stated that a minimum sample size of 100 or 200 is required for a structural equation model. In 2013, a larger sample size was required for a more complex model. Williams et al. (2010) found that a sample size of 500 was the most accurate for complex equations. After inputting all required information into the calculator, the expected effect size was determined to be 0.2, with a desired statistical power level of 0.8. The model consisted of 7 latent and 27 observed variables, with a probability scale of 0.05. The researchers calculated the minimum detectable result to be 425 and determined the minimum sample size for the model structure to be 109, with a recommended minimum sample size of 425. They collected 500 samples from four institutions of higher learning in Sichuan to obtain more accurate statistical results.

### 3.4 Sampling Technique

The questionnaires were distributed online through the web board of each institution's website for one month starting May 2023. Therefore, convenience sampling is employed for respondents willing to answer the questionnaires. Respondents are filtered from screening questions to ensure they meet the target respondents of undergraduates with at least one year of learning experience with online study.

**Table 1:** Sample Units and Sample Size

| The four schools | Population Size | Proportional Sample Size |
|---|---|---|
| Sichuan University | 17952 | 185 |
| Southwest University for Nationalities | 13950 | 144 |
| Sichuan Conservatory of Music | 4469 | 46 |
| Chengdu University | 12229 | 126 |
| **Total** | **48600** | **500** |

**Source:** Constructed by author

## 4. Results and Discussion

### 4.1 Demographic Information

The demographics of the total 500 respondents and the sample size of the four universities are shown in Table 2 below.

**Table 2:** Demographic Profile

| Demographic and General Data (N=500) | | Frequency | Percentage |
|---|---|---|---|
| **Gender** | Male | 120 | 24% |
| | Female | 380 | 76% |
| **Online Learning Experience** | One year | 183 | 36.6% |
| | 2-3 Years | 142 | 28.4% |
| | 4-5 Years | 47 | 9.4% |
| | Over 5 Years | 128 | 25.6% |

### 4.2 Confirmatory Factor Analysis (CFA)

Confirmatory Factor Analysis (CFA) is a crucial starting point for Structural Equation Modelling (SEM) (Hair et al.,

2010). CFA can be used to measure the reliability and validity of variables (Byrne, 2010). Convergent validity can be statistically measured using Cronbach's Alpha reliability, factor load, mean-variance extraction (AVE), and composite reliability (CR) (Fornell & Larcker, 1981). A factor loads above 0.50 is highly significant (Hair et al., 1998). The study found that each factor had a load greater than 0.50, with most exceeding 0.70 (ranging from 0.619 to 0.811, as shown in Table 4). As recommended by Fornell and Larcker (1981) and Hair et al. (1998), the composite reliability (CR) should be 0.70 or higher, and the mean-variance extraction (AVE) should be at least 0.4. Table 4 shows that all estimates are significant when CR values exceed 0.7 and AVE values exceed 0.5. Cronbach's alpha is a technique used to assess the internal consistency of a project's structure (Killingsworth et al., 2016). To indicate acceptable reliability, Cronbach's alpha value should be 0.7 or higher (George & Mallery, 2003; Hair et al., 2010). Table 3 shows that all Cronbach alphas are above 0.7, indicating acceptable reliability.

**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 |
|---|---|---|---|---|---|---|
| Information Quality (IQ) | Nelson et al. (2005) | 3 | 0.825 | 0.619-0.811 | 0.773 | 0.534 |
| System Quality (SQ) | Selwyn (2007) | 3 | 0.814 | 0.757-0.788 | 0.814 | 0.594 |
| Course Website Quality (CWQ) | Shen (2009) | 4 | 0.797 | 0.619-0.811 | 0.813 | 0.523 |
| Instructor Quality (IQUA) | Badia et al. (2019) | 3 | 0.765 | 0.651-0.839 | 0.775 | 0.537 |
| Reliability (REL) | Zeithaml and Bitner (2003) | 5 | 0.861 | 0.688-0.785 | 0.864 | 0.560 |
| Online Learning Satisfaction (OLS) | Strong et al. (2012) | 5 | 0.804 | 0.580-0.730 | 0.807 | 0.457 |
| Online Learning Continuous Intention (OLCI) | Guo et al. (2023) | 4 | 0.813 | 0.662-0.788 | 0.823 | 0.540 |

Table 4 displays the goodness of fit indicators, including CMIN/DF, GFI, AGFI, NFI, CFI, TLI, and RMSEA. All of these CFA statistical values are greater than the acceptable values, confirming the measurement model's goodness of fit.

**Table 4:** Goodness of Fit for Measurement Model

| Fit Index | Acceptable Criteria | Statistical Values |
|---|---|---|
| **CMIN/ DF** | ≤ 5.0 (Al-Mamary & Shamsuddin, 2015; Awang, 2012) | 605.618 / 303 = 1.999 |
| **GFI** | ≥ 0.85 (Sica & Ghisi, 2007) | 0.920 |
| **AGFI** | ≥ 0.80 (Sica & Ghisi, 2007) | 0.900 |
| **NFI** | ≥ 0.90 (Wu & Wang, 2006) | 0.891 |
| **CFI** | ≥ 0.80 (Bentler, 1990) | 0.942 |
| **TLI** | ≥ 0.80 (Sharma et al., 2005) | 0.933 |
| **RMSEA** | < 0.08 (Pedroso et al., 2016) | 0.045 |
| **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

According to Fornell and Larcker (1981), testing for discriminant validity was evaluated by computing the square root of each AVE. Based on this study, the value of discriminant validity is larger than all inter-construct/factor correlations. Therefore, the discriminant validity is supportive. The convergent and discriminant validity were proved; Therefore, the evidence is sufficient for establishing construct validity.

**Table 5:** Discriminant Validity

| | IQ | SQ | CWQ | IQUA | REL | OLS | OLCI |
|---|---|---|---|---|---|---|---|
| **IQ** | **0.731** | | | | | | |
| **SQ** | 0.215 | **0.771** | | | | | |
| **CWQ** | 0.165 | 0.163 | **0.723** | | | | |
| **IQUA** | 0.148 | 0.197 | 0.185 | **0.733** | | | |
| **Rel** | 0.175 | 0.221 | 0.194 | 0.227 | **0.748** | | |
| **OLS** | 0.324 | 0.306 | 0.274 | 0.336 | 0.260 | **0.676** | |
| **OLCI** | 0.221 | 0.247 | 0.202 | 0.185 | 0.202 | 0.365 | **0.735** |

**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 employed structural equation modeling (SEM) to analyze the collected data. SEM has several advantages. Firstly, it can explore dependency relationships (Hair et al., 2010). Secondly, it examines the causal relationship between latent and observed variables. Thirdly, random errors in the observed variables are used to provide more accurate measurement results. Finally, it uses multiple indicators to measure potential variables. Finally, it is possible to test hypotheses at the building level, not just at the project level (Hoyle, 2011). Table 6 shows the reference values and literature for the goodness of fit. The goodness of fit of the structural model in this study is presented in Table 6, The statistical values were as follows: CMIN/DF = 2.386, GFI = 0.896, AGFI = 0.877, NFI = 0.863, CFI = 0.915, TLI = 0.906, and RMSEA = 0.053. The model's suitability was confirmed as all fitting indexes exceeded the acceptable values.

**Table 6:** Goodness of Fit for Structural Model

| Fit Index | Acceptable Criteria | Statistical Values |
|---|---|---|
| **CMIN/ DF** | ≤ 5.0 (Al-Mamary & Shamsuddin, 2015; Awang, 2012) | 758.728 / 318 = 2.386 |
| **GFI** | ≥ 0.85 (Sica & Ghisi, 2007) | 0.896 |
| **AGFI** | ≥ 0.80 (Sica & Ghisi, 2007) | 0.877 |
| **NFI** | ≥ 0.90 (Wu & Wang, 2006) | 0.863 |
| **CFI** | ≥ 0.80 (Bentler, 1990) | 0.915 |
| **TLI** | ≥ 0.80 (Sharma et al., 2005) | 0.906 |
| **RMSEA** | < 0.08 (Pedroso et al., 2016) | 0.053 |
| **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

Regression coefficients or standardized path coefficients are used to measure the correlation between the independent and dependent variables proposed in the hypothesis.

**Table 7:** Hypothesis Results of the Structural Equation Modeling

| Hypothesis | (β) | t-value | Result |
|---|---|---|---|
| H1: IQ→OLS | 0.119 | 5.170* | Supported |
| H2: SQ→OLS | 0.106 | 4.511* | Supported |
| H3: CWQ→OLS | 0.097 | 3.853* | Supported |
| H4: IQUA→OLS | 0.184 | 4.953* | Supported |
| H5: REL→OLS | 0.079 | 2.517* | Supported |
| H6: OLS→OLCI | 0.529 | 6.731* | Supported |

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

Table 7 demonstrate that all six proposed hypotheses are supported. Students' satisfaction with online learning strongly influences their willingness to continue. Information quality, system quality, course website quality, teacher quality, and reliability all affect students' satisfaction with online learning, with information quality and teacher quality having a significant impact. The relationship between information quality and students' satisfaction with online learning is indicated by a path coefficient of 0.119 in H1, with a T-value of 5.170. In H4, the path coefficient between teacher quality and students' satisfaction with online learning is 0.184, with a T-value of 4.953.

Additionally, the impact of system quality and website course quality is examined. In H2, the path coefficient between system quality and students' satisfaction with online learning is 0.106, with a T-value of 4.511. The standardized path coefficient of the path relationship between website course quality and students' online learning satisfaction is 0.097, with a T-value of 3.853 in H3. In the path relation H5, the standardized path coefficient of reliability and students' online learning satisfaction is 0.079 with a T-value of 2.517. The satisfaction of students with online learning significantly impacts their willingness to continue with it. This relationship is demonstrated by a standardized path coefficient of 0.529 and a T-value of 6.731 in H6. Students' satisfaction with online learning is influenced not only by the quality of information, system, course website quality, teacher, and reliability but also strongly impacts their willingness to continue with online learning. Students' satisfaction with online learning is influenced not only by the quality of information, system, website course, teacher, and reliability but also strongly impacts their willingness to continue with online learning.

## 5. Conclusion and Recommendation

### 5.1 Conclusion and Discussion

This study aims to comprehensively analyze the factors influencing online learning satisfaction and continuous learning willingness among college students in the Chengdu area. The researchers propose six hypotheses in the conceptual framework to explore the factors that affect online learning satisfaction and the willingness to continue online learning of senior-year college students. After compiling and verifying the questionnaire was distributed to students online. The language used in the questionnaire is clear, concise, and objective, with a formal register and precise word choice. The text adheres to conventional academic structure and formatting, with consistent citation and footnote style. The four selected universities in Chengdu are representative of different academic fields. No changes in content have been made. Sichuan University is a comprehensive university, Southwest University for Nationalities specializes in higher education for ethnic minorities, Sichuan Conservatory of Music focuses on the arts, and Chengdu University is a locally-funded institution. The research conceptual model's validity and reliability were measured and tested by CFA using the collected data. The factors influencing online learning satisfaction and continuous learning willingness of college students in the Chengdu area were analyzed and discussed using scanning electron microscopy. All six proposed hypotheses were supported, achieving the research objectives.

The results indicate that the conceptual model can predict the factors that affect online learning satisfaction and the willingness to continue learning among students in the Chengdu area. Information quality and teacher quality are the most significant factors affecting students' online learning satisfaction, followed by system quality, website course quality, and reliability. Online learning satisfaction is the strongest predictor directly and indirectly affecting students' willingness to continue learning online.

### 5.2 Recommendation

In light of the comprehensive analysis of factors, the researchers identified the key factors influencing senior-year college students' online learning satisfaction (OLS). These factors include information quality (IQ), teacher quality (IQua), website course quality (CWQ), system quality (SQ), and reliability (Rel). Additionally, the study examined the impact of OLS on willingness to continue learning online (OLCI). The Chengdu region showed a higher value for these factors. It is recommended that these key factors be further developed. In this study, the driving effect of information quality and teacher quality on students' online learning satisfaction was significant. Therefore, this study suggests that universities and institutions involved in developing online learning software should focus on improving information and teacher quality factors and system quality to enhance students' perception of the system's usefulness.

Additionally, students' expectations of the learning system will determine their satisfaction with the learning experience (Lee, 2010; Lin et al., 2012). It is also important to improve students' willingness to continue learning online. Student satisfaction is the strongest predictor of both direct and indirect willingness to continue using online learning.

### 5.3 Limitation and Further Study

This study identified five potential variables that could influence student satisfaction, with the quality of information being the most significant. Therefore, future teaching practices and software development should prioritize improving the quality of information in online learning. Research has shown that the quality of information, including accessibility, timeliness, accuracy, and relevance, can impact students' perceived satisfaction with online learning. Therefore, improving the quality of information can lead to a more positive attitude towards online learning and increase students' willingness to continue learning online.

Because this study only focuses on higher education in Chengdu, the collection and selection of data is limited to senior-year students from four universities, so there are certain limitations. Therefore, the scope and sample size are limited. In addition, the selection needs more detailed professional classification and accurate positioning. In order to strengthen the research framework for the conceptual structure of student online learning satisfaction, it may be useful to consider other potential variables such as behavioral intention, social influence, self-efficacy, effort expectation, trust, perceived interaction, learning motivation, and facilitating conditions. In addition, this can improve the correlation between non-school target groups' satisfaction with online learning and their willingness to continue online learning, such as whether they have graduated from university, participated in social work, and are still engaged in online continuous learning for self-improvement purposes. To increase the academic value and social impact of the research.

## References


Ahn, T., Ryu, S., & Han, I. (2007). The impact of Web quality and playfulness on user acceptance of online retailing. *Information Management, 44*(3), 263-275. https://doi.org/10.1016/j.im.2006.12.008

Al-Fraihat, D., Joy, M., Masa'deh, R., & Sinclair, J. (2020). *E-learning Systems Measure [Database record]* (1st ed.). APA PsycTests.

Alkhalaf, S., Nguyen, J., Nguyen, A., & Drew, S. (2015). Online Learner Satisfaction and Collaborative Learning. *International Journal of Information and Communication Technology Education, 9*(2), 66-78.

Al-Mamary, Y. H., & Shamsuddin, A. (2015). Testing of the technology acceptance model in context of yemen. *Mediterranean Journal of Social Sciences, 6*(4), 268-273. https://doi.org/10.5901/mjss.2015.v6n4s1p268

Awang, Z. (2012). *Structural equation modeling using AMOS graphic*. Penerbit Universiti Teknologi MARA.

Badia, A., Reeves, C. E., & Baker, A. R. (2019). Importance of reactive halogens in the tropical marine atmosphere: a regional modelling study using WRF-Chem. European. *Geosciences Union. 19*(5), 3161-3189. https://doi.org/10.5194/acp-2017-903-supplement

Bai, B., Law, R., & Wen, I. (2008). The Impact of Website Quality on Customer Satisfaction and Purchase Intentions: Evidence from Chinese Online Visitors. *International Journal of Hospitality Management, 27,* 391-402. https://doi.org/10.1016/j.ijhm.2007.10.008

Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin, 107*(2), 238-246. https://doi.org/10.1037/0033-2909.107.2.238

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

Byrne, B. M. (2010). *Structural equation modeling with AMOS: Basic concepts, applications, and programming* (2nd ed.). Routledge Taylor & Francis Group.

Cao, M., Zhang, Q., & Seydel, J. (2005). B2C e-commerce web site quality: an empirical examination. *Industrial Management & Data Systems, 105*(5), 645-661. https://doi.org/10.1108/02635570510600000

Clark, R. C., & Mayer, R. E. (2003). *e-learning and the science of instruction* (1st ed.). Jossey-Bass.

Cole, M. T., Shelley, D. J., & Swartz, L. B. (2014). Online Instruction, E-Learning, and Student Satisfaction: A Three-Year Study. *The International Review of Research in Open and Distributed Learning, 15,* 111-131. https://doi.org/10.19173/irrodl.v15i6.1748

Decman, M. (2015). Modeling the acceptance of e-learning in mandatory environments of higher education: The influence of previous education and gender. *Computers in Human Behavior, 49*, 272-281. https://doi.org/10.1016/j.chb.2015.03.022

DeLone, W. H., & McLean, E. R. (2003). The DeLone and McLean model of information systems success: A ten-year update. *Journal of Management Information Systems, 19*(4), 9-30.

Fornell, C., & Larcker, D. F. (1981). Evaluating Structural Equation Models with Unobservable Variables and Measurement Error. *Journal of Marketing Research, 18*(1), 39-50. https://doi.org/10.1177/002224378101800104

Gao, Y. Z. (2021). *Study on the influence of teacher-student interaction on college students' online learning satisfaction* [Chinese Master's Theses]. Tongfang Knowledge Network (Beijing) Technology. https://doi.org/10.27328/d.cnki.gshsc.2021.000747.

Gautam, P. (2020). *Advantages And Disadvantages of Online Learning*. eLearning industry. https://elearningindustry.com/advantages-and-disadvantages-online-learning

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

Grönroos, C. (2001). The Perceived Service Quality Concept—A Mistake? *Managing Service Quality: An International Journal, 11,* 150-152. https://doi.org/10.1108/09604520110393386

Guo, Q., Zeng, Q., & Zhang, L. (2023). What social factors influence learners' continuous intention in online learning? A social presence perspective. *Information Technology & People, 36*(3), 1076-1094. https://doi.org/10.1108/itp-02-2021-0151

Hair, J., Anderson, R., Tatham, R., & Black, W. (1998). *Multivariate data analysis* (5th ed.). Prentice Hall.

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate Data Analysis* (7th ed.). Pearson.

Herzog, W., & Boomsma, A. (2009). Small-sample robust estimators of noncentrally-based and incremental model fit. *Structural Equation Modeling: A Multidisciplinary Journal, 16*(1), 1-27. https://doi.org/10.1080/10705510802561279

Hoyle, R. H. (2011). *Structural equation modeling for social and personality psychology* (1st ed.). Sage Publications Ltd.

Jiang, Y., Shang, J., & Jiao, L. (2023). Tsinghua UniversityReview of China's Online Education Policy, 1999–2022. *ECNU Review of Education, 6*(1), 155-182.

Killingsworth, K., Miller, S. A., & Alavosius, M. P. (2016). A Behavioral Interpretation of Situation Awareness: Prospects for Organizational Behavior Management. *Journal of Organizational Behavior Management, 36*(4), 301-321. https://doi.org/10.1080/01608061.2016.1236056

Kim, T. G., Lee, J. H., & Law, R. (2008). An empirical examination of the acceptance behaviour of hotel front office systems: An extended technology acceptance model. *Tourism Management, 29*(3), 500-513. https://doi.org/10.1016/j.tourman.2007.05.016

Kuo, Y., Walker, A. E., Schroder, K. E. E., & Belland, B. R. (2014). Internet and Higher Education Interaction, Internet Self-Efficacy, and Self-Regulated Learning as Predictors of Student Satisfaction in Online Education Courses. *Internet and Higher Education, 20,* 35-50. https://doi.org/10.1016/j.iheduc.2013.10.001

Lee, J.-W. (2010). Online support service quality, online learning acceptance, and student satisfaction. *The Internet and Higher Education, 13*(4), 277-283. https://doi.org/10.1016/j.iheduc.2010.08.002

Lin, H. F. (2007). Knowledge Sharing and Firm Innovation Capability: An Empirical Study. *International Journal of Manpower, 28,* 315-332. https://doi.org/10.1108/01437720710755272

Lin, J., Wang, P.-U., & Lin, I.-C. (2012). Pedagogy technology: A two-dimensional model for teachers' ICT integration. *British Journal of Educational Technology, 43*(1), 97-108. https://doi.org/10.1111/j.1467-8535.2010.01159.x

Lin, J. C. C., & Lu, H. (2000). Towards an Understanding of the Behavioural Intention to Use a Web Site. *International Journal of Information Management, 20,* 197-208. https://doi.org/10.1016/S0268-4012(00)00005-0

Lin, S. H. J., & Johnson, R. E. (2015). A Suggestion to Improve a Day Keeps Your Depletion Away: Examining Promotive and Prohibitive Voice Behaviors within a Regulatory Focus and Ego Depletion Framework. *Journal of Applied Psychology, 100,* 1381-1397. https://doi.org/10.1037/apl0000018

Naveh, G., Tubin, D., & Pliskin, N. (2012). Student Satisfaction with Learning Management Systems: A lens of critical success factors. *Technology Pedagogy and Education. 21*(3), 337-350. https://doi.org/10.1080/1475939x.2012.720413

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

Ngai, E. W. T., Poon, J. K. L., & Chan, Y. H. C. (2007). Empirical examination of the adoption of WebCT using TAM. *Computers & Education, 48*(2), 250-267. https://doi.org/10.1016/j.compedu.2004.11.007

Pedroso, R., Zanetello, L., Guimarães, L., Pettenon, M., Gonçalves, V., Scherer, J., Kessler, F., & Pechansky, F. (2016). Confirmatory factor analysis (CFA) of the Crack Use Relapse Scale (CURS). *Archives of Clinical Psychiatry (São Paulo), 43*(3), 37-40. https://doi.org/10.1590/0101-60830000000081

Perkowitz, M., & Etzioni, O. (1999). Towards adaptive Web sites: conceptual framework and case study. *Computer Networks, 31*(11-16), 1245-1258. https://doi.org/10.1016/s1389-1286(99)00017-1

Pham, N. T., Tučková, Z., & Chiappetta Jabbour, C. J. (2019). Greening the hospitality industry: How do green human resource management practices influence organizational citizenship behavior in hotels? A mixed-methods study. *Tourism Management, 72*, 386-399. https://doi.org/10.1016/j.tourman.2018.12.008

Quang, R., Luhnen, M., & Waffenschmidt, S. (2017). Quality Assessment of Systematic Reviews of Health Economic Evaluations: Pitfalls with the Application of the PRISMA Statement. *Systematic Reviews in Pharmacy, 8*(1), 52-61. https://doi.org/10.5530/srp.2018.1.16

Rai, A., Lang, S. S., & Welker, R. B. (2002). Assessing the Validity of IS Success Models: An Empirical Test and Theoretical Analysis. *Information Systems Research, 13*(1), 50-69. https://doi.org/10.1287/isre.13.1.50.96

Rapanta, C., Botturi, L., Goodyear, P., Guàrdia, L., & Koole, M. (2020). Online University Teaching During and After the Covid-19 Crisis: Refocusing Teacher Presence and Learning Activity. *Postdigital Science and Education, 2*(3), 923-945. https://doi.org/10.1007/s42438-020-00155-y

Raza, S. A., & Hanif, N. (2013). Factors affecting internet banking adoption among internal and external customers: a case of Pakistan. *International Journal of Electronic Finance, 7*(1), 82. https://doi.org/10.1504/ijef.2013.051746

Ren, C. M., & Xu, L. D. (2021). A study on the influencing factors of college students' online learning from the perspective of learning satisfaction: A case study of students in Ningde Normal University. *Journal of Ningde Normal University Philosophy and Social Sciences, 1*(3), 103-111.

Rotchanakitumnuai, S., & Speece, M. (2004). Corporate customer perspectives on business value of Thai Internet banking. *Journal of Electronic Commerce Research - JECR. 5,* 270-286.

Selwyn, N. (2007). The use of computer technology in university teaching and learning: A critical perspective. *Journal of Computer Assisted Learning, 23*(2), 83-94. https://doi.org/10.1111/j.1365-2729.2006.00204.x, 83-94.

Sharma, G. P., Verma, R. C., & Pathare, P. (2005). Mathematical modeling of infrared radiation thin layer drying of onion slices. Journal of Food Engineering, *Journal of Food Engineering, 71*(3), 282-286. https://doi.org/10.1016/j.jfoodeng.2005.02.010

Shen, Y. (2009). Investor Protection and Capital Structure of Listed Companies. *The Economic Research, 1,* 131-142.

Shin, D.-H. (2009). Towards an understanding of the consumer acceptance of mobile wallet. *Computers in Human Behavior, 25*(6), 1343-1354. https://doi.org/10.1016/j.chb.2009.06.001

Sica, C., & Ghisi, M. (2007). The Italian versions of the Beck Anxiety Inventory and the Beck Depression Inventory-II: Psychometric properties and discriminant power. In M.A. Lange (Ed.), *Leading - Edge Psychological Tests and Testing Research* (pp. 27-50). Nova

Strong, R., Irby, T. L., Wynn, J. T., & McClure, M. M. (2012). Investigating Students' Satisfaction with eLearning Courses: The Effect of Learning Environment and Social Presence. *Journal of Agricultural Education, 53*(3), 98-110. https://doi.org/10.5032/jae.2012.03098

Tabachnick, B. G., & Fidell, L. S. (2007). *Using Multivariate Statistics* (5th ed.). Allyn and Bacon.

Tan, C. H. Y. (2015). Technological "Nudges" and Copyright on Social Media Sites. *Software publishing, 1*(1), 1-10.

Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. *International Journal of Medical Education, 2,* 53-55. https://doi.org/10.5116/ijme.4dfb.8dfd

Teo, H.-H., Chan, H.-C., Wei, K.-K., & Zhang, Z. (2003). Evaluating information accessibility and community adaptivity features for sustaining virtual learning communities. *International Journal of Human-Computer Studies, 59*(5), 671-697. https://doi.org/10.1016/s1071-5819(03)00087-9

Toffler, A. (1970). *Future Shock* (1st ed.). Random House.

Tsai, J. Y., Egelman, S., Cranor, L., & Acquisti, A. (2011). The Effect of Online Privacy Information on Purchasing Behavior: An Experimental Study. *Information Systems Research, 22*(2), 254-268. https://doi.org/10.1287/isre.1090.0260

Van Birgelen, M. J. H., Wetzels, M. G. M., & van Dolen, W. M. (2008). Effectiveness of corporate employment web sites: How content and form influence intentions to apply. *International Journal of Manpower, 29*(8), 731-751. https://doi.org/10.1108/01437720810919323

Williams, B., Onsman, A., & Brown, T. (2010). Exploratory Factor Analysis: A Five-Step Guide for Novices. *Australasian Journal of Paramedicine, 8*, 1-13. https://doi.org/10.33151/ajp.8.3.93

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

Zeithaml, V. A., & Bitner, M. J. (2003). *Services Marketing: Integrating Customer Focus across the Firm* (3rd ed.). Irwin McGraw-Hill.

Zhai, X. M., & Shi, L. H. (2020). Understanding how the perceived usefulness of Mobile technology impacts physics learning achievement, a pedagogical perspective. *Journal of Science Education and Technology, 29,* 743-757. https://doi.org/10.1007/s10956-020-09852-6

Zhang, X. H. (2019). Research on the Relationship of Grit, Online Self-regulated Learning and Online Learning Satisfaction. *International Journal of Learning and Teaching, 1*(2), 1-10.