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# The Assessment on Science and Engineering Undergraduates' Satisfaction and Loyalty towards Network Teaching Platform in Chengdu, China

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## Abstract

**Purpose:** This research evaluates factors impacting science and engineering undergraduates' satisfaction and loyalty toward network teaching platforms. The key variables include trust, experience, service quality, perceived value, privacy, satisfaction, and loyalty. **Research design, data, and methodology:** Quantitative method was applied for this research by using probability and nonprobability methods, The sampling techniques are judgmental, stratified random and convenience sampling. 503 samples were collected from two target universities, namely, Xihua University (XHU) and Jincheng College of Chengdu (JCCCD). Index of item objective congruence (IOC) and Cronbach's Alpha reliability test for pilot test (n=30) were approved before the data collection. Confirmatory Factor Analysis (CFA) and Structural Equation Model (SEM) were utilized to determine the relationships of the variables under study. **Results:** Service quality, perceived value, privacy and trust have a significant impact on satisfaction. Additionally, satisfaction and trust significantly impact loyalty. On the other hand, experience has no significant impact on satisfaction. **Conclusions:** Since online education plays an essential role in the information age and networking, universities and colleges widely adopt the teaching platform. It is important to acknowledge what factors impact undergraduates' loyalty and satisfaction towards these platforms, and sufficient attention should be paid to these factors according to the finding of this research.

**Keywords :** Online Learning, Network Teaching Platform, Loyalty, Satisfaction, Science and Engineering

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

## 1. Introduction

As information technology develops rapidly, college teaching is networked and information. People construct a virtual network teaching platform where teachers and students can communicate without barriers, even if they are not in the same space. Students can study independently in virtual study rooms and chat in virtual rooms, discussing learning problems with teachers and classmates and contacting teachers through the platform dialogue system and emails to ask questions. E-Learning has become a primary means of training for college students and revolutionized the pedagogical ecosystem (Yuanbo & Pongsatha, 2023).

Orey and Rosa (2016) believed that with the help of a powerful and massive knowledge database, learners could choose from all available educational resources that are compatible with their own knowledge background, hobbies, and learning styles so that they can reach teaching goals faster; At same time, teachers and instructional designers can better use and configure various educational resources to help achieve the teaching goals. Dziuban and Moskal (2011) believed that network teaching retains not only the effective socialization opportunities of classroom teaching but also the

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network learning environment supported by information technology. The initiative and enthusiasm of students in learning have significant advantages. Nowadays, China's colleges and universities have begun to introduce network teaching platforms, which are more popular in the following three categories: first is to use common communication software such as Super Star, Tencent Conference, and Ding Talk as the teaching platform to teach and explain. The second is to promote the development of network teaching in higher education institutions by using well-known new teaching platforms such as Shanghai Center for Excellence. Third, colleges and universities develop network teaching platforms by studying the actual needs of their development. Such platforms have high pertinence and relatively low development cost, but their compatibility and adaptability still need improvement.

Due to breakthroughs in information technology, millions of college students in China could take classes on a network teaching platform when the COVID-19 pandemic broke out in 2020. Although the appearance of a network teaching platform brings much convenience, the satisfaction and loyalty of college students to a network teaching platform largely determine the efficiency of online learning, especially for science and engineering students. Science and engineering students require more practice and experience to understand better. Thus, to further understand science and engineering students' attitudes towards different network teaching platforms, this study investigated the two Sichuan Higher Institutions including Xihua University (XHU) and Jincheng College of Chengdu (JCCCD), to figure out the mechanism of the satisfaction and loyalty of science and engineering college students. So that recommendations and suggestions could be proposed to improve other science and engineering students' satisfaction and loyalty toward the network teaching platform. The objective of this study is to evaluates factors impacting science and engineering undergraduates' satisfaction and loyalty toward network teaching platforms.

## 2. Literature Review

### 2.1 Experience

Chen and Chen (2010) thought that experience is the social and mental reaction of network learners to the experience results of studying attractions. This means there is a notional difference between service quality and experience. Customer experience is one of the key factors to test the success of marketing. Providing customers with a more efficient and convenient service experience is the goal of all enterprises (Sharma et al., 2022). After experiencing this, customers will understand the product's value (Song et al., 2019). Experience is divided into direct contact and indirect contact. Experience is often expressed through sensory, cognitive, emotional, behavioral, and relational values (Sudiyono et al., 2022). Customer experience is the impression customers leave during various direct or indirect interactions with service providers during consumption (Meyer & Schwager, 2007). Accordingly, the present study posits the hypothesis:

**H1:** Experience has a significant impact on satisfaction.

### 2.2 Service Quality

Service quality is a customer's overall impression of an organization's weaknesses, advantages, and services (Parasuraman et al., 1985). Service quality is a decisive factor for a company to maintain competitiveness. Shin and Kim (2008) believed that service quality is the learner's or user's overall reaction to the relative efficiency of a network service supporter. Parasuraman et al. first proposed the five dimensions of service quality reliability, tangibility, responsiveness, assurance, and empathy (Parasuraman et al., 1985). Khudhair et al. (2019) believe that in the aviation field, companies need to understand customer needs and improve service quality based on customer needs (Khudhair et al., 2019). If the service quality exceeds or meets customer expectations, customer satisfaction will greatly increase, whereas satisfaction will decrease if it is lower than consumer expectations (Nyan et al., 2020). Accordingly, the present study posits the hypothesis:

**H2:** Service quality has a significant impact on satisfaction.

### 2.3 Perceived Value

Value is a multidimensional concept of various dimensions or attributes (Sweeney & Soutar, 2001). Sweeney and Soutar (2001) developed a perceived value scale with four dimensions: functional, emotional, economic, and social. Parasuraman and Grewal (2000) suggested that perceived value is a learners' complete assessment of the effectiveness of service depending on their acquired and given feelings. Perceived value varies from person to person, with subjectivity and multidimensional nature (Zeithaml, 1988). Perceived value can provide insight into the hotel experience of customers, thereby better predicting their behavioral outcomes, such as customer satisfaction and loyalty (El-Adly, 2019). Accordingly, the present study posits the hypothesis:

**H3:** Perceived value has a significant impact on satisfaction.

### 2.4 Privacy

Consumers often suffer from marketing behaviors such as fraud, invasion of Privacy, and unnecessary marketing communication, so consumers pay great attention to privacy protection (Martin & Murphy, 2017). Kassim and Asiah Abdullah (2010) believed Privacy means the guardianship of various types of data collected during a user's interplay with a network system, which may affect the use of the system. Lack of control over personal data and doubts about how retailers handle their data in commercial transactions can cause customer privacy concerns (Plangger & Montecchi, 2020). Ross emphasized that Privacy and security are important determinants of whether customers purchase online (Ross, 2005). Cristobal et al. (2007) believed online security/privacy is an increasingly important issue affecting unauthorized access, distribution, and clandestine or fraudulent use of personal information/financial data as made possible by new technologies. Additionally, in the online purchase process, Privacy refers to the ability of a website to protect customers' personal information. Thus, the researcher puts forward hypotheses:
**H4a:** Privacy has a significant impact on satisfaction.
**H4b:** Privacy has a significant impact on trust.

### 2.5 Trust

Trust is important in maintaining the relationship between customers and suppliers (Song et al., 2019). Trust is "a willingness to rely on an exchange partner in whom one has confidence" (Moorman et al., 1992). Trust depends on the quality provided. Customers hope that suppliers respond to their interests and can promise to provide good goods or services, which can better conduct transactions (Prisanti et al., 2017). Trust is a general expectation of one person towards another (Rotter, 1967). Customer trust can increase purchasing interest, improving purchasing behavior (Kausel & Connolly, 2014). Trust is also the foundation for establishing and maintaining trust relationships (Heri, 2017). Gefen argued that online services rarely gain customer trust (Gefen, 2000). Therefore, two hypotheses are presented per below:
**H5:** Trust has a significant impact on satisfaction.
**H7:** Trust has a significant impact on loyalty.

### 2.6 Satisfaction

Satisfaction is the overall evaluation of a product or service over a period resulting from consumer experience (Oliver, 1999). Olsen and Johnson (2003) emphasized that satisfaction means evaluating customers' experience and transaction reactions. Customer satisfaction is crucial to the development of an enterprise and is an important driving factor for improving customer loyalty and financial success (Ravishankar & Christopher, 2020). Because customer satisfaction is a key factor influencing the formation of customers' future purchasing intentions. Ameer uses customer satisfaction as a variable to evaluate a service or product, reflecting the level of happiness customers receive from consumption (Ameer, 2014). As a one-dimensional structure, customer satisfaction reflects the overall impression of all interactions between customers and service organizations during their interactions (Yang & Peterson, 2004). Customer satisfaction indicators provide necessary information for business managers to understand and identify customers' true needs (Kim, 2008). Accordingly, the present study posits the hypothesis:
**H6:** Satisfaction has a significant impact on loyalty.

### 2.7 Loyalty

Customer loyalty is an important factor in maintaining competitive advantage in fierce competition (Leninkumar, 2017). Some early studies defined loyalty as behavioral loyalty, including revisiting, or buying back services or products (Tellis, 1988). Some studies on customer loyalty use the perspective of attitudinal loyalty, which reflects the emotional and psychological desire of customers to repurchase and recommend to others (Tanford et al., 2012). Dick and Basu divide customer loyalty into four stages: cognitive loyalty, emotional loyalty, conscious loyalty, and action loyalty (Dick & Basu, 1994). These four stages of customer loyalty describe the behavioral and attitudinal characteristics of customer loyalty (Jin et al., 2016).

## 3. Research Methods and Materials

### 3.1 Research Framework

In order to construct the conceptual framework, existing scientific research approaches were examined. The researcher adapted five major previous research frameworks to support and develop a conceptual framework for this study. Santa et al. (2019) first identified an interrelationship between trust, quality of the service, and user satisfaction. Furthermore, Kovačević et al. (2021) studied the relationship between online learning experience, attitudes toward online learning, and satisfaction with online courses. Moreover, Alzahrani and Seth (2021) studied the relationship between information quality, service quality, and satisfaction. Nugroho et al. (2019) studied the relationship between perceived value, continuance intention, and satisfaction. Rani et al. (2019) studied the relationship between perceived ease of use, usefulness, privacy & security, and e-satisfaction. Pham et al. (2019) studied the relationship

between e-learning service quality attributes, overall e-learning service quality, e-learning student satisfaction, and e-learning student loyalty. Lastly, Li et al. (2015) studied the relationship between value perception, website design, security/privacy, e-satisfaction, e-trust, and e-loyalty.

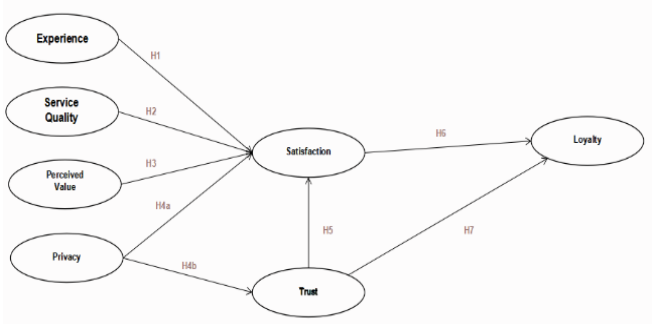


**Figure 1:** Conceptual Framework

**H1:** Experience has a significant impact on satisfaction.
**H2:** Service quality has a significant impact on satisfaction.
**H3:** Perceived value has a significant impact on satisfaction.
**H4a:** Privacy has a significant impact on satisfaction.
**H4b:** Privacy has a significant impact on trust.
**H5:** Trust has a significant impact on satisfaction.
**H6:** Satisfaction has a significant impact on loyalty.
**H7:** Trust has a significant impact on loyalty.

### 3.2 Research Methodology

This study uses a quantitative approach using survey questionnaires as a data collection tool. The participants had to fill out a questionnaire individually. In order to improve reliability, a pilot study was conducted, and a questionnaire was distributed to students from Xihua University (XHU) and Jincheng College of Chengdu (JCCCD) through a questionnaire survey. The questionnaire was separated into three components: screening questions, demographic information, and the scale items for the observed variables. First and foremost, a standardized screening question was initially designed to distinguish and examine persons with characteristics, so the researcher could ensure the respondents were qualified and samples were suitable for the subsequential interview. Next, demographic information questions were used to gather baseline information about the respondents, such as gender, major direction, and university information. Finally, the five-point Likert scale was used for rating the answers to 34 scale items.

For the validity of the scale items, three experts with Ph.D. educational background, who hold at least an associate professor, and at least nine years of experience in online education academic researchers were invited to conduct the item-objective congruence (IOC) assessment to examine the precise objectives recommended by the instrument developer for this investigation. The results were approved with a score over 0.6. To test for the instrument's reliability, 30 students participated in the pilot test; Isaac and Michael (1995) determined that the scope of 10 to 30 participants was appropriate. Therefore, the pilot test included 30 students, and Cronbach's Alpha score was employed to evaluate the internal consistency reliability of the questionnaire. The results were ensured at a score over 0.7 (Nunnally & Bernstein, 1994).

### 3.3 Population and Sample Size

The population in this study includes all undergraduate students majoring in science and engineering from two representative public colleges in Chengdu, China, Xihua University (XHU) and Jincheng College of Chengdu (JCCCD). Moreover, it showed that a good size sample, like 200-500, was needed for multiple regression, covariance analysis, and log-linear analysis (Kline, 2005). The analysis could be performed for further rigorous main impact assessment. Therefore, the researcher aimed to collect at least 500 samples from higher education institutions in Chengdu for better statistical results.

### 3.4 Sampling Technique

The researcher employed a sampling methodology which could be divided into three steps. In the first step, judgmental was adopted. Undergraduates from Xihua University (XHU) and Jincheng College of Chengdu (JCCCD) were selected for the study. For the second step, stratified sampling was used. In order to collect at least 500 samples to conduct the study, the proportional sample size was distributed to the two universities according to their total number of undergraduates. Thus, 312 samples from XHU and 188 samples from JCCCD were required. Finally, convenience sampling was conducted by online questionnaire distribution.

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

| University | Population | Proportional Sample Size |
|---|---|---|
| **XHU** | 44797 | 312 |
| **JCCCD** | 26993 | 188 |
| **Total** | **71790** | **500** |

**Source:** Constructed by author

## 4. Results and Discussion

### 4.1 Demographic Information

After conducting the formal survey, 550 questionnaires were received. However, after examining the 550

questionnaires, only 503 were qualified and were used for further analysis. The detailed demographic profile information of the 503 respondents is shown in Table 3. Among them, 315 were from Xihua University (XHU), and 188 were from Jincheng College of Chengdu (JCCCD), which reached the minimum requirement for 312 samples needed from XHU and 188 samples needed from JCCCD. Male respondents composed 66.20% of the total, while female respondents composed 33.80%. The age Under 18 years old of respondents covered 0.80%, the age between 18 to 20 covered 44.33%, the age between 21 to 23 covered 51.09%, the age between 24 to 25 covered 3.18%, and the age over 25 years old covered 0.60%. For the academic year classification, 25.45% of respondents were 1st-year students, 19.68% were 2nd-year students, 42.94% were 3rd-year students, and 9.54% were 4th-year students. About using network teaching platform time, 10.54% of respondents had used a network teaching platform for less than 1 year, 20.48% of respondents had used a network teaching platform for 1 to 2 years, 23.65%respondents had used a network teaching platform for 2-3 years, and 45.33% of respondents had using network teaching platform over 3 years. Regarding devices for using network teaching platforms, using mobile phone respondents covered 59.84%, using Pad respondents covered 7.75%, using personal computer respondents covered 31.81%, and the respondents using other devices covered 0.60%.

**Table 2:** Demographic Profile

| Demographic and General Data (N=503) | | Frequency | Percentage |
|---|---|---|---|
| **University** | JCCCD | 188 | 37.38% |
| | XHU | 315 | 62.62% |
| **Gender** | Male | 333 | 66.20% |
| | Female | 170 | 33.80% |
| **Age** | Under 18 years old | 4 | 0.80% |
| | 18-20 years old | 223 | 44.33% |
| | 21-23 years old | 257 | 51.09% |
| | 24-25 years old | 16 | 3.18% |
| | Over 25 years old | 3 | 0.60% |
| **Grade** | First year | 128 | 25.45% |
| | Sophomore year | 99 | 19.68% |
| | Third year | 216 | 42.94% |
| | Fourth year | 48 | 9.54% |
| | Others | 12 | 2.39% |
| **Years of using network teaching platform** | Less than 1 year | 53 | 10.54% |
| | 1-2 years | 103 | 20.48% |
| | 2-3 years | 119 | 23.65% |
| | More than 3 years | 228 | 45.33% |
| **Devices for using network teaching platform** | Mobile phone | 301 | 59.84% |
| | Pad | 39 | 7.75% |
| | Personal computer | 160 | 31.81% |
| | Others | 3 | 0.60% |

**Source:** Constructed by author

## 4.2 Confirmatory Factor Analysis (CFA)

To evaluate whether the scale items' constituent and loading counts matched expectations based on theories or presumptions, we did the confirmatory factor analysis (CFA) to examine them. The outcome of each observed variable's factor loading and admissible values identified the goodness of fit of the research matrix (Hair et al., 2010).

The researchers utilized the statistical programs. The researchers also conducted confirmatory factor analysis (CFA) in order to evaluate the factor loading, t-value, composite reliability (CR), average variance extracted (AVE), and discriminant validity. The structural equation model (SEM) was subsequently employed to investigate the outcomes of the hypotheses and the direct, indirect, and overall effects of the correlations between the latent variables.

As demonstrated in Table 3, all the factor loading were more than 0.5, composite reliability (CR) over 0.70, average variance extracted (AVE) higher than 0.50, and Cronbach's Alpha (CA)' s values are higher than 0.7 (Nunnally & Bernstein, 1994). These indicators were above the critical value to confirm convergent validity of CFA (Sarmento & Costa, 2016).

**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 |
|---|---|---|---|---|---|---|
| Trust (T) | Song et al. (2019) | 3 | 0.784 | 0.747-0.805 | 0.8223 | 0.607 |
| Experience (EX) | Song et al. (2019) | 3 | 0.740 | 0.802-0.865 | 0.866 | 0.683 |
| Service quality (SQ) | Parasuraman et al. (1985) | 5 | 0.920 | 0.725-0.852 | 0.885 | 0.607 |
| Perceived value (PV) | Sweeney and Soutar (2001) | 3 | 0.910 | 0.762-0.847 | 0.836 | 0.630 |
| Privacy (P) | Kassim and Asiah Abdullah (2010) | 3 | 0.922 | 0.780-0.805 | 0.832 | 0.623 |
| Satisfaction (S) | Oliver (1999) | 4 | 0.948 | 0.702-0.795 | 0.829 | 0.549 |
| Loyalty (L) | Leninkumar (2017) | 5 | 0.942 | 0.521-0.988 | 0.892 | 0.631 |

Furthermore, as presented in Table 4, all indicators, such as CMIN/DF, GFI, AGFI, CFI, TLI, IFI, and RMSEA, after adjustment, were acceptable.

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

| Fit Index | Acceptable Criteria | Statistical Values Before Adjustment | Statistical Values After Adjustment |
|---|---|---|---|
| **CMIN/DF** | <3.00 (Hair et al., 2010) | 4.115 | 2.185 |
| **GFI** | > 0.90 (Hair et al., 2010) | 0.874 | 0.917 |
| **AGFI** | >0.80 (Sica & Ghisi, 2007) | 0.841 | 0.894 |
| **CFI** | > 0.90 (Hair et al., 2006) | 0.879 | 0.955 |
| **TLI** | ≥ 0.90 (Hair et al., 2006) | 0.859 | 0.946 |
| **NFI** | ≥ 0.90 (Bollen, 1989) | 0.880 | 0.955 |
| **RMSEA** | < 0.08 Pedroso et al. (2016) | 0.079 | 0.049 |
| **Model Summary** | | **Not in harmony with empirical data** | **In harmony with empirical data** |

**Remark:** CMIN/DF = The ratio of the chi-square value to degree of freedom, GFI = Goodness-of-fit index, AGFI = Adjusted goodness-of-fit index, CFI = Comparative fit index, TLI = Tucker–Lewis index, NFI = Normed fit index and RMSEA = Root mean square error of approximation.

Of the discriminant validity illustrated in Table 5, the diagonally specified quantity is the AVE square root of the variables. All correlations crossing any two latent variables were less than 0.8. Therefore, the discriminant validity was testified through these quantitative measurements (Liu et al., 2020).

**Table 5:** Discriminant Validity

| | T | EX | SQ | PV | P | S | L |
|---|---|---|---|---|---|---|---|
| **T** | **0.779** | | | | | | |
| **EX** | 0.342 | **0.827** | | | | | |
| **SQ** | 0.361 | 0.263 | **0.779** | | | | |
| **PV** | 0.296 | 0.352 | 0.287 | **0.794** | | | |
| **P** | 0.438 | 0.380 | 0.351 | 0.392 | **0.789** | | |
| **S** | 0.497 | 0.319 | 0.407 | 0.409 | 0.462 | **0.741** | |
| **L** | 0.221 | 0.119 | 0.192 | 0.144 | 0.147 | 0.201 | **0.795** |

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

## 4.3 Structural Equation Model (SEM)

After assessing the CFA, the structural equation model (SEM) evaluation was carried out in this study. The SEM analysis evaluates a specific sequence of linear equation coefficients to confirm whether the hypothesized causality model fits. Additionally, SEM examines the causal relationship between the characteristics in the specified matrix and accounts for assessment bias or dishonesty in the coefficient (Rattanaburi, 2021). As illustrated in Table 6, all the values after being adjusted to meet the criterion, which included CMIN/DF, GFI, AGFI, CFI, TLI, and RMSEA. Thus, the goodness of SEM was verified.

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

| Fit Index | Acceptable Criteria | Statistical Values Before Adjustment | Statistical Values after Adjustment |
|---|---|---|---|
| **CMIN/DF** | <3.00 (Hair et al., 2010) | 4.148 | 2.272 |
| **GFI** | > 0.90 (Hair et al., 2010) | 0.870 | 0.912 |
| **AGFI** | >0.80 (Sica & Ghisi, 2007) | 0.839 | 0.890 |
| **CFI** | > 0.90 (Hair et al., 2006) | 0.875 | 0.950 |
| **TLI** | ≥ 0.90 (Hair et al., 2006) | 0.857 | 0.942 |
| **NFI** | ≥ 0.90 (Bollen, 1989) | 0.876 | 0.920 |
| **RMSEA** | < 0.08 Pedroso et al. (2016) | 0.079 | 0.050 |
| **Model Summary** | | **Not in harmony with empirical data** | **In harmony with empirical data** |

**Remark:** CMIN/DF = The ratio of the chi-square value to degree of freedom, GFI = Goodness-of-fit index, AGFI = Adjusted goodness-of-fit index, CFI = Comparative fit index, TLI = Tucker–Lewis index, NFI = Normed fit index and RMSEA = Root mean square error of approximation.

## 4.4 Research Hypothesis Testing Result

According to the consequences shown in Table 7, the trust had the strongest direct influence on satisfaction, which a standardized path coefficient (β) was 0.281 (t-value of 4.931***). Perceived value had the second-powerful effect on satisfaction, which a standardized path coefficient(β) was 0.193 (t-value of 3.571***). Next, service quality affected satisfaction with β at 0.189 (t-value of 3.736***), and privacy affected satisfaction with β at 0.186 (t-value of 2.843**).

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

| Hypothesis | (β) | t-Value | Result |
|---|---|---|---|
| H1: EX→S | 0.045 | 0.878 | Not Supported |
| H2: SQ→PEOU | 0.189 | 3.736*** | Supported |
| H3: PV→S | 0.193 | 3.571*** | Supported |
| H4a: P→S | 0.186 | 2.843** | Supported |
| H4b: P→T | 0.471 | 8.383*** | Supported |
| H5: T→S | 0.281 | 4.931*** | Supported |
| H6: S→L | 0.134 | 2.723** | Supported |
| H7: T→L | 0.153 | 3.069** | Supported |

**Note:** *** p<0.001, ** p<0.01, * p<0.05
**Source:** Created by the author

According to the results in Table 7, experience had a positive effect on satisfaction but no significance. Thus, **H1** is not confirmed in this research. The possible reason was that most network teaching platforms investigated in this study were used for communication and learning between teachers and students without providing additional teaching resources. So, the experience of the network teaching platform did not influence students' satisfaction.

About **H2,** the analysis results showed that service quality positively affects students' satisfaction with the network teaching platform, with a standardized path coefficient value of 0.189. Shin and Kim (2008) believed that service quality is the learner's or user's overall reaction to the relative efficiency of a network service supporter, so it is obvious that the service quality of a network teaching platform impacts students' satisfaction towards a network teaching platform.

Regarding **H3**, the statistical result in Table 7 validated the significant influence of Perceived Value on satisfaction, representing the common coefficient value of 0.193. According to El-Adly (2019), perceived value can provide insight into the hotel experience of customers, thereby better predicting their behavioral outcomes, such as customer satisfaction.

Furthermore, **H4a** illustrates that privacy contributes to satisfaction in this study, indicating the common coefficient value at 0.186. **H4b** demonstrates that privacy has a greater effect on trust, with the standardized path coefficient value of 0.471. According to Nyaga et al. (2021), privacy (psychological, physical, and informational) strongly correlates with satisfaction. Moreover, privacy positively affects trust (Dehghanpouri et al., 2020).

The statistical outcome for **H5** validated the hypothesis for the significant influence of trust on satisfaction, representing the common coefficient value of 0.281. According to Kassim and Asiah Abdullah (2010), trust is the foundation for developing customer loyalty.

Additionally, **H6** demonstrated that satisfaction contributes to loyalty in this study, indicating the common coefficient value at 0.134. Ravishankar and Christopher (2020) confirmed that customer satisfaction is crucial to the development of an enterprise and is an important driving factor for improving customer loyalty and financial success.

Finally, trust significantly impacted loyalty, for the standardized path coefficient value at 0.153 in the **H7.** According to the research of Nejjari and Aamoum (2020), the trust of graduates in university positively influences their loyalty.

# 5. Conclusion and Recommendation

## 5.1 Conclusion and Discussion

This study aims to verify the factors that affect the satisfaction and loyalty to online teaching platforms for students majoring in science and engineering in two public schools in Chengdu, China, and using a conceptual framework to generate 7 hypotheses to determine the reaction mechanism between experience, trust, service quality, perceived value, privacy and satisfaction, and loyalty. Multistage sampling was then used to choose 500 respondents as the final sample from the universities. To validate the effectiveness and reliability of the conceptual framework, confirmatory factor analysis (CFA), composite reliability (CR), and mean-variance extraction (AVE) were used for scientific calculations. In addition, we used Structural Equation Modeling (SEM) to validate the correlation between research hypotheses and potential variables. According to the results of this investigation, Service quality, perceived value, trust, and privacy have a significant positive impact on satisfaction, with privacy having a significant impact on trust and trust and satisfaction having a direct and significant impact on loyalty. However, the research hypothesis that experience affects satisfaction has not been supported.

The findings reveal that service quality, perceived value, privacy, and trust significantly influence student satisfaction. Moreover, both satisfaction and trust play a significant role in determining student loyalty. However, it's noteworthy that experience does not have a significant impact on satisfaction. This result may indicate that students prioritize other factors, such as the quality of service and perceived value, over their past experiences when evaluating network teaching platforms.

Implications for Education Providers: Educational institutions and online platform providers can benefit from these findings by focusing on improving service quality, ensuring students perceive value in their offerings, maintaining high levels of trust and privacy, and prioritizing student satisfaction to foster loyalty. This information can guide strategic decisions to enhance the online learning experience and retain students in these programs.

## 5.2 Recommendation

Based on the data from this quantitative survey, researchers suggest carefully considering the interrelationships between experience, trust, service quality, perceived value, privacy, satisfaction, and loyalty. The following suggestions can improve the satisfaction and loyalty of online teaching platforms, providing a better service experience for the student community.

Since the research has verified the significant relationship between service quality and satisfaction, paying more attention to improving the service quality of online teaching platforms is necessary. Multiple ways could be used to achieve this goal. For online teaching platform providers, they can constantly enrich the types of platforms to provide more choices for users, timely obtain customer feedback and improve their service accordingly, simplify the network teaching platform usage process and provide necessary guidelines and courses for users' better use of all functions of the platform. For colleges and universities, it is important to listen to undergraduates' voices, allow them to select their preferred network teaching platforms or switch from one to another platform, and help them get the necessary recourses for improving their perceived service quality.

In order to improve undergraduates' perceived value, improve their satisfaction and loyalty, universities and colleges need to make sure that undergraduates can obtain enough valuable and useful learning resources on the network learning platforms, and the quality of courses conducted through network teaching platforms needs to be supervised and upgraded constantly so that students regard network teaching platforms valuable.

For privacy, online teaching platform providers must respect and protect customer privacy, as privacy leakage can cause customers to distrust or even stop to use the platform. More importantly, the platform providers must let users understand what measurements they have taken to protect their privacy and make them feel safe to use the platform. Universities and colleges must also respect students' privacy on network teaching platforms. For example, when using network teaching platforms to grade courses or propose suggestions to teachers, universities and colleges need to make sure that students can have the choice to be complete anonymity.

Since this research has revealed the strong relationship between privacy, trust, and satisfaction, improving privacy can promote trust and satisfaction. Apart from that, other measures could be taken to make online teaching platforms more trustworthy, including continuously recommending and providing quality learning resources and ensuring that there are no fraud or legality problems when students order online teaching products on online teaching platforms. In general, online teaching platform developers, educators, and universities must continuously improve service quality, make users perceive the platform's value, protect users' privacy, and make them believe the platforms are trustworthy.

### 5.3 Limitation and Further Study

Firstly, this study only selected students from two representative public universities in southwestern China as research samples, and the research scope can be expanded to other regions of China in the future. Secondly, more techniques can be considered. This study belongs to a cross-sectional research design and can only partially reveal the causal relationship between variables. It is impossible to test the temporal evolution effects between variables strictly. Experiments or longitudinal tracking studies across time can be used in the future.

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