

The Online Chinese Learning Satisfaction and its Associated Factors Among International Students in Yunnan of China

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Abstract

The objectives of this research were (1) To explore the current situation of international students' satisfaction with online Chinese learning at the Yunnan Normal University; (2) To identify the relationship between the variables influencing student satisfaction in the context of online Chinese learning; and (3) To examine the relationship between student satisfaction and perceived learning performance.

The population was international students at Yunnan Normal University. The sample size was 300. The research instruments employed included questionnaires and interviews. The data obtained were reported as descriptive statistics, Confirmation Factor Analysis (CFA), and Structural Equation Model (SEM) for hypothesis testing.

The study results have identified that six variables, online learning self-efficacy, learner-instructor interaction, learner-learner interaction, learner-content interaction, internet quality, and technology quality, were the significant factors that influence student satisfaction, and student satisfaction also significantly influences perceived learning performance in the context of learning Chinese online. Finally, the author makes some suggestions. (1) teachers should encourage students to cultivate their self-efficacy and strengthen the cultivation of self-control ability. (2) The selection of teaching materials should also pay attention to the characteristics of online learning, and online teaching should use some content that can generate interaction with classmates to stimulate students' interest. (3) international students must take the initiative to participate in learning, interact more with classmates, and pay more attention to real-time interactive learning opportunities in online classes. (4) technology and networks are very important; teachers should have a basic grasp of the teaching platform to be used before teaching.

Keywords: The Online Chinese Learning Satisfaction; International Students; Yunnan of China.

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Introduction

In recent years, the concept of "One Belt, One Road", initiation of the "Silk Road" economic corridor, and adaptation of the "Internet+" national strategy have brought about significant transformations and openings for Chinese international education (Yalun, 2019). The era of traditional teaching has gone, and utilizing technology in the classroom has resulted in significant educational advancements (Wang & East, 2020). Chinese teaching resources and methods must incorporate the latest technologies and products on new media platforms to adequately address the evolving demands of global Chinese education (Su & Peng, 2022). International Chinese education has transformed into online (Cao & Cai, 2022). Internationally, studies have indicated that students' satisfaction in online learning environments during the pandemic has reduced, and they have become increasingly disengaged (Chan et al., 2021). There is limited research on international students' satisfaction with online Chinese learning.

Based on the previous research results, this study explores the influencing factors of international students' online learning satisfaction and the relationship between student satisfaction and perceived learning performance. Form a questionnaire that conforms to the actual situation of international students' satisfaction in the context of online learning. Taking international students who were studying at Yunnan Normal University as an example, by investigating their online learning satisfaction, problems existing in online Chinese learning could be found.

A vast online learning experiment was carried out in China (Guo & Wan, 2022). The COVID-19 pandemic has brought challenging circumstances to the world, leading to school and university closures and millions of children, teenagers, and young adults being unable to attend school or university (Rajabalee & Santally, 2021). As such, many teachers are navigating their way forward. There is limited research on international students' satisfaction with online Chinese learning. By understanding learners' perspectives, teaching can be tailored more effectively.

Online teaching is not merely a result of the epidemic, but rather, an inevitable trend in educational development in the Internet era (Lockee, 2021). Analyzing students' satisfaction with online learning might give useful information for post-pandemic program development (Alasagheirin et al., 2023). The findings of the research can contribute to the development and improvement of policies, strategies, and educational practices related to online learning. The results can help identify areas that need attention in the teaching process, such as instructional design, technological infrastructure, student support, and engagement strategies, thus enhancing the overall online learning experience.

Research Objectives

The research objectives have been formulated as follows.

- 1) To determine the current situation of international students' satisfaction with online Chinese learning at the Yunnan Normal University.
- 2) To identify the relationship between the variables that influence student satisfaction in the context of online Chinese learning.
- 3) To examine the relationship between student satisfaction and perceived learning performance.

Literature Review

Online Learning and Online Learning Chinese

Online learning is well-known to have a history of use dating back to the 1980s, although the origins of the word "e-learning" are not entirely documented (Harasim, 2000). Online education, according to Benson (2002) and Conrad (2002), is a more contemporary kind of distant education that increases access to educational possibilities for students who are classified as being both unconventional and marginalized. A wealth of research into online language learning has emerged from the COVID-19 crisis (Kohnke & Moorhouse, 2022; Ji et al., 2022).

Chinese language learners were doing online Chinese language learning, for a variety of reasons, such as there being a shortage of teachers, to balance their daily obligations with their studies, etc. Before the pandemic broke out, the main goal of online education was to give individuals who couldn't attend a conventional, location-based academic program access to teaching (Lockee, 2021). After the outbreak of the pandemic, international students could not come to China online learning is more inventive and involves students in more interactive learning by using educational technology. Chinese teachers also could not go to local schools to teach and had to teach online. Hu's (2023) study focused on Chinese language higher education teachers in the US and their preferences for online or blended teaching approaches post-COVID-19. The research underscored the importance of adapting and enhancing pedagogical methods to better serve students in the post-pandemic era.

Online Learning Self-Efficacy (OLSE)

Bandura (1986) conceptualized self-efficacy as a person's belief that an individual could complete a task and use the skills possessed to produce a specified performance level, which determined people's motivation and behavior. In terms of online learning self-efficacy, we need to consider self-efficacy in three aspects at least: technology, learning, and social interactions (Shen et al, 2013). Gunawardena et al (2010) consider online self-efficacy to be the belief that one has the confidence to complete online learning.

Learner-Instructor Interaction (LII)

Interaction between the course instructor and the students is referred to as learner-instructor interaction (Moore & Kearsley, 1996). It can take numerous forms, including advice, support, appraisal, and encouragement (Moore, 1989). Learner-instructor interaction was described as the only required interaction in learner learning (Battalio, 2007). Woollen & Rabe-Hemp (2009) revealed that students who had less contact with the faculty members experienced higher levels of discontent. Seo et al. (2021) suggested that learner-instructor interaction significantly affects learners' satisfaction and learning outcomes.

Learner-Content Interaction (LCI)

According to Moore (1989), learner-content interaction is the process of engaging intellectually with the subject to alter the learner's perspective, cognitive structures, or level of knowledge. Learner-content interaction is learner-non-human interaction (Hirumi, 2011). Interaction's content-driven goal in distance learning was described by Thurmond & Wombach (2004) as the learner's participation in the course's technical medium, other learners, the instructor, and the course's material. Lin et al. (2016) find that only learner-content interaction significantly predicts learners' perceived progress.

Learner-Learner Interaction (LLI)

Learner-learner interaction is defined as interaction between learners and their peers, the interaction could happen through spoken or written dialogue, referring to interaction among individuals or learners' teamwork (Moore, 1989). According to Kuo et al. (2014), learner-learner interaction entails two-way reciprocal communication between learners, whether an instructor is present or not. Technology improves by leaps and bounds, when learning Chinese online, learner-learner interaction can be synchronous, such as chatting in the video conference instantly, or asynchronous, such as leaving messages in WeChat groups or sending emails. According to Sher (2009), learner-learner interaction is a significant contributor to student satisfaction.

Internet Quality (IQ) and Technology Quality (TQ)

Internet quality is network quality as perceived by learners, and technology quality refers to how well-designed e-learning tools like electronic whiteboards, earbuds, and microphones are perceived by students (Sun et al., 2008). According to Bush & Dawson (2013), the Internet is not only a powerful means of communication but also arguably the most potent force for education and innovation since the creation of the printing press. According to several research, online learning is substantially impacted by the quality of the technology and the Internet. (Hiltz, 1993; Piccoli et al., 2001; Webster & Hackley, 1997). Therefore, educational technology is an important component of successful online education (Osika & Sharp, 2002).

Student Satisfaction (SS)

Student satisfaction is determined by students' subjective perceptions of their learning experience and the level of support provided by their learning environment to their academic success (Lo, 2010). It is the attitude, perception, and expectation of students toward online learning environments (Wu et al., 2010). Strong student satisfaction suggests that the teaching strategies are stimulating students' thinking and learning in an acceptable way. The general satisfaction of online students is influenced by many factors. For instance, students are more satisfied with their online courses if they communicate appropriately with their peers and instructors (Bolliger & Martindale, 2004; De Paepe et al., 2018). Technological tools, course features, or teacher behaviors that facilitate online student communication have also been found to elevate students' satisfaction (De Paepe et al., 2018). Online language teachers face challenges in maintaining student participation, engagement, and communication during classes (Yue, 2011).

Perceived Learning Performance (PLP)

Perceived learning performance refers to students' opinions of their performance in the learning process (Keržič et al., 2021). Perceived learning performance measures how students perceive their learning experience through intangible indicators, such as their level of engagement, satisfaction, and attitude toward learning (Li et al., 2018; Vo et al., 2017). Previous research in the fields of education and computer-mediated learning has demonstrated a positive correlation between learning performance and satisfaction (Martins & Kellermanns, 2004; Shih, 2006; Tao et al., 2009; Wang et al., 2014).

Research Methodology

Research design

This is the mixed method research design that was applied in the research. The quantitative research part employed the questionnaire items to explore students' attitudes toward the variables studied. In addition to the qualitative part, the interview questions were applied to further collect in-depth perceptions of the samples.

The quantitative survey research design identified the variables as follows.

In this research, independent variables are online learning self-efficacy, learner-content interaction, learner-instructor interaction, learner-learner interaction, internet quality, and technology quality. Student satisfaction as a mediator variable. Perceived learning performance is the dependent variable.

Population and Sample

This study surveyed a total of about 300 international students who have studied Chinese online at Yunnan Normal University. The international students as samples come from different countries and regions with different cultural backgrounds. They are the people who have taken at least one semester (4 months) of online Chinese courses, and interested in Chinese language learning, and have at least 1 year of Chinese language learning background. According to the structural equation model sample size calculator (Soper, 2023), the minimum sample size of this survey was 256 to ensure the validity of the research results.

Research Instrument

Questionnaires and interviews were used to collect data and related information. The survey adopted the online learning self-efficacy from Alqurashi (2018) to assess the participants' self-efficacy about online learning. Eighteen items were adopted from Kuo et al. (2014) to assess the participants' perceptions about online learner-learner, learner-instructor, and learner-content interactions. Eight items were adopted from Sun et al. (2008) and Amoroso & Cheney (1991) to assess the internet and technology quality perceived by learners during online learning. Nine items were adopted from Keržič et al. (2021) to assess the participant's satisfaction with their online learning and their perceived learning performance. The detailed information is displayed in Table 1.

Table 1: Operationalization Table of Questionnaire

Variables	Definition	Operationalization	Source	Scale
Demographic Characteristics	The personal information of student participants.	1. Gender 2. Age 3. Experience in learning Chinese (time duration) 4. HSK level 5. Nationality		Personal Choice

Online Learning Self-Efficacy (OLSE)	Online learning self-efficacy refers to the students' self-efficacy to complete an online course. (Alqurashi, 2018)	<ol style="list-style-type: none"> 1. Complete an online course with a good grade. 2. Understand complex concepts. 3. Willing to face challenges. 4. Successfully complete all of the required online activities. 5. Keep up with the course schedule. 6. Create a plan to complete the given assignments. 7. Willingly adapt my learning styles to meet course expectations. 8. Evaluate assignments according to the criteria provided by the instructor. 	Alqurashi (2018)	5-point Likert scale (1 = cannot do at all and 5 = highly confident can do)
Learner-Instructor Interaction (LII)	Learner-instructor interaction refers to two-way communication between the instructor of the course and learners (Moore & Kearsley, 1996).	<ol style="list-style-type: none"> 1. I had numerous interactions with the instructor during the class. 2. I asked the instructor my questions through different electronic means, such as email, discussion board, instant messaging tools, etc. 3. The instructor regularly posted some questions for students to discuss on the discussion board. 4. The instructor replied to my questions in a timely fashion. 5. I replied to messages from the instructor. 6. I received enough feedback from my instructor when I needed it. 	Kuo et al. (2014)	5-point Likert scale (1 = strongly disagree and 5 = strongly agree)
Learner-Content Interaction (LCI)	Learner-content interaction refers to a one-way process of elaborating and reflecting on the subject matter or the course content (Moore, 1989).	<ol style="list-style-type: none"> 1. Online course materials helped me to understand better the class content. 2. Online course materials stimulated my interest in this course. 3. Online course materials helped me relate my personal experience to new concepts or new knowledge. 4. It was easy for me to access the online course materials. 	Kuo et al. (2014)	5-point Likert scale (1 = strongly disagree and 5 = strongly agree)

Learner-Learner Interaction (LLI)	<p>Learner-learner interaction involves a two-way reciprocal communication among learners, with or without the presence of an instructor. By interacting with fellow students, students can exchange ideas with and get feedback from each other (Anderson, 2003; Moore, 1989).</p>	<p>1. Overall, I had numerous interactions related to the course content with fellow students.</p> <p>2. I got lots of feedback from my classmates.</p> <p>3. I communicated with my classmates about the course content through different electronic means, such as email, discussion boards, instant messaging tools, etc.</p> <p>4. I answered questions from my classmates through different electronic means, such as email, discussion board, instant messaging tools, etc.</p> <p>5. I shared my thoughts or ideas about the lectures and their application with other students during this class.</p> <p>6. I comment on other students' thoughts and ideas.</p> <p>7. Group activities during class gave me chances to interact with my classmates.</p> <p>8. Class projects led to interactions with my classmates.</p>	Kuo et al. (2014)	5-point Likert scale (1 = strongly disagree and 5 = strongly agree)
Internet Quality	<p>Internet quality is network quality as perceived by learners. (Sun et al., 2008)</p>	<p>1. I feel satisfied with the speed of the Internet</p> <p>2. I feel the communication quality of the Internet is not good (R)</p> <p>3. I feel the fee to connect to the Internet is very expensive (R)</p> <p>4. I feel it's easy to go online</p> <p>Note: (R) reverse coded.</p>	Sun et al.(2008)	5-point Likert scale (1 = strongly disagree and 5 = strongly agree)
Technology Quality	<p>The definition of technology quality is the learners' perceived quality of IT applied in e-learning (such as microphones, earphones, electronic blackboards, and so on). (Sun et al., 2008)</p>	<p>I feel the information technologies used in online learning ...</p> <p>1. are very easy to use</p> <p>2. have many useful functions</p> <p>3. have good flexibility</p> <p>4. are easy to obtain</p>	Amoroso and Cheney (1991)	5-point Likert scale (1 = strongly disagree and 5 = strongly agree)

Student Satisfaction	The student's subjective evaluation of various outcomes and experiences that the student deems as favorable. Student satisfaction is constantly shaped by their continuous experiences in campus life. (Elliott & Shin, 2002).	1. I am satisfied with online classes 2. I am satisfied with online tutorials and practical classes 3. I am satisfied with online supervision 4. I am satisfied with the teaching staff 5. I am satisfied with online student counseling services	Keržič et al. (2021)	5-point Likert scale (1 = strongly disagree and 5 = strongly agree)
Perceived Learning Performance	Perceived learning performance is conceptualized as the perceived learning outcome that results from the online learning experience (Au, Ngai, and Cheng 2008). In this study, perceived learning performance is conceptualized as the perceived learning outcome that results from online Chinese language learning.	1. Online learning helps improve my performance. 2. Online learning is a good adaptation to the new teaching and learning experience. 3. I master the skills taught in the online classes. 4. Online learning enhances my mastery of difficult classwork.	Keržič et al. (2021)	5-point Likert scale (1 = strongly disagree and 5 = strongly agree)

The interviews were informal discussions where participants were invited to openly answer questions and describe their opinions about online learning. This allowed for thoroughly investigating variables connected to international students' perspectives and potential problems. The interview questions are shown in Table 2.

Table 2: Interview Questions

Dimensions	Interview Questions
Views of online learning	1. When studying Chinese, do you think online learning helps you to understand the content more? Why or why not?
	2. Does online learning benefit your learning? Why or why not?
Overall satisfaction	3. What do you find most satisfying and least satisfying about online learning?

A pilot survey was conducted to test the reliability before carrying out large-scale studies. This research aims to collect 256 samples for the full study. Thus, the trial group of 100 participants was early assessed by Cronbach's Alpha coefficient test. Generally, Cronbach's alpha coefficient test score of .70 or higher is acceptable (Taherdoost, 2016). The reliability of each dimension in this study is above 0.8, which means that the reliability of each dimension in the questionnaire is high. The detailed information is displayed in Table 3.

Table 3: Results of Cronbach's Alpha of the Research Instruments.

Variable	Number of Items	Cronbach's Alpha
Online Learning Self-Efficacy (OLSE)	8	.936
Learner-Instructor Interaction (LII)	6	.898
Learner-Learner Interaction (LLI)	8	.934
Learner-Content Interaction (LCI)	4	.858
Internet Quality (IQ)	4	.875
Technology Quality (TQ)	4	.896
Student Satisfaction (SS)	5	.909
Perceived Learning Performance (PLP)	4	.858

Validity of Research Instruments

The Item-Objective Congruence (IOC) index, as introduced by Rovinelli & Hambleton (1977), is a quantifiable way to measure the evaluations of subject matter professionals on test items. The researchers invited three experts with doctorates in philosophy who are engaged in related research or who have prior relevant professional experience. The results of the three experts revealed that the IOC rating of all items was higher than 0.67, which confirmed the content validity, according to Turner & Carlson (2003).

Data Collection Procedures

This study applies the questionnaire survey and interviews to collect data. Data were collected for two months from November to December 2023. Questionnaires answered anonymously were collected online by Wenjuanxing. Online interviews were conducted through Tencent Meeting. Before the data collection processes, the samples were informed that the data was kept confidential and only reviewed by the researcher. Additionally, participants were made aware that they could withdraw from the study at any time.

Data Analysis

The quantitative data were analyzed by IBM SPSS version 23 and Amos version 24. The descriptive statistics were calculated to report the sampled demographic information and the perceptions towards each questionnaire item. The inferential statistics were applied for the proposed hypotheses testing using Structural Equation Modeling (SEM). In addition, the qualitative data—the interview data were analyzed using content analysis by NVivo.

Research Conceptual Framework

The study aimed to explore the relationship between the variables that influence student satisfaction in the context of online Chinese learning, and the relationship between student satisfaction and perceived learning performance. The conceptual framework was founded on earlier concepts and models closely related to the theoretical frameworks. Yandra et al.'s (2021) framework provided insight into the connection between online learning self-efficacy and satisfaction. The second theoretical framework was developed by Ayanbode et al. (2022). It provided the study of learner-learner interaction, learner-instructor interaction, learner-content interaction, and student satisfaction. The third theoretical framework was proposed by Harsasi & Sutawijaya (2018). It provided an analysis of technology quality and

student satisfaction. The last theoretical framework was developed by Keržič et al. (2021). It provided the study of student satisfaction and perceived learning performance. The research framework of this study is presented in Figure 1.

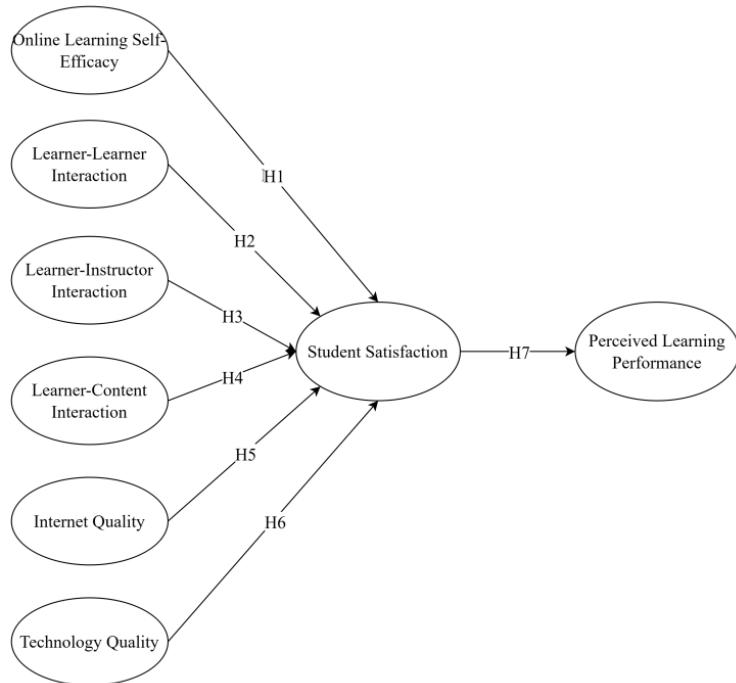


Figure 1: Research Conceptual Framework

There were seven hypotheses developed according to the previous research and theoretical framework.

H1: Online learning self-efficacy influences student satisfaction in the context of learning Chinese online.

H2: Learner-instructor interaction influences student satisfaction in the context of learning Chinese online.

H3: Learner-learner interaction influences student satisfaction in the context of learning Chinese online.

H4: Learner-content interaction influences student satisfaction in the context of learning Chinese online.

H5: Internet quality influences student satisfaction in the context of learning Chinese online.

H6: Technology quality influences student satisfaction in the context of learning Chinese online.

H7: Student satisfaction influences perceived learning performance in the context of learning Chinese online.

Research Results

Descriptive Statistics

Demographic Information of samples.

Descriptive analysis provides a straightforward overview of the sample, allowing for a better understanding of its composition and characteristics. A total of 300 questionnaires were collected through Wenjuanxing. The sample distribution in this study is mainly described by gender, age, experience of learning Chinese (time duration), and HSK level. The distribution of demographic characteristics of participants in the valid questionnaire is shown in Table 4.

Table 4: Frequency Analysis (n=300)

Variable	Category	Frequency	Percentage
Gender	Female	188	62.7%
	Male	112	37.3%
	Total	300	100%
Age	20 years old and below	14	4.6%
	Between 21-25 years old	140	46.6%
	Between 26 – 30 years old	133	44.3%
	31 years old or above	13	4.3%
	Total	300	100%
Experience of Learning Chinese (time duration)	Below 5 years	147	49%
	5 years above	153	51%
	Total	300	100%
HSK level	HSK4	107	35.6%
	HSK5	168	56%
	HSK6	25	8.4%
	Total	300	100%

Result of Research Objective 1: To determine the current situation of international students' satisfaction with online Chinese learning at the Yunnan Normal University.

The results of the data analysis for research objective 1 are based on the descriptive analysis of variable-student satisfaction.

Descriptive Analysis of Variables

This study describes the statistics of each variable using mean and standard deviation (SD), the specific information shown in Table 6. In this study, the 5 Level Likert Scale questionnaire (Agreement) was employed to collect samples' perceptions toward each variable measured. To interpret the data obtained, the following arbitrary level is utilized to interpret the mean value for each variable, which is shown in Table 5.

Table 5: Arbitrary Level for Interpretation of Questionnaire Data

Likert scale score	Range	Interpretation
5	4.51 - 5.00	Strongly Agree
4	3.51 - 4.50	Agree
3	2.51 - 3.50	Neutral
2	1.51 - 2.50	Disagree
1	1.00 - 1.50	Strongly Disagree

Table 6: Descriptive Statistics of Variables

Variables	Mean	SD	Interpretation
Online Learning Self-Efficacy (OLSE)	3.73	0.67	Agree
Learner-Instructor Interaction (LII)	3.96	0.65	Agree
Learner-Learner Interaction (LLI)	3.56	0.82	Agree
Learner-Content Interaction (LCI)	3.60	0.78	Agree
Internet Quality (IQ)	3.91	0.67	Agree
Technology Quality (TQ)	3.62	0.83	Agree
Student Satisfaction (SS)	4.03	0.58	Agree
Perceived Learning Performance (PLP)	3.68	0.80	Agree

Table 6 presents the results of the students' satisfaction with online learning. The mean score of 4.03 indicates agreement with various aspects of online learning Chinese, such as classes, tutorials, supervision, teaching staff, and counseling services. The low standard deviation of 0.58 and consistent positive ratings suggest a strong collective agreement among participants regarding their satisfaction with the online learning experience.

Result for Research Objectives 2: To identify the relationship between the variables that influence student satisfaction in the context of online Chinese learning; and 3: To examine the relationship between student satisfaction and perceived learning performance.

The data analysis results for research objectives 2 and 3 are based on Confirmatory Factor Analysis (CFA) for inferential statistics and Structural Equation Model (SEM) for hypothesis testing.

Confirmatory Factor Analysis (CFA)

The objective of confirmatory factor analysis (CFA) is to test whether the data fit a hypothesized measurement model. The results of CFA can provide compelling evidence of the convergent and discriminant validity of theoretical constructs.

Convergent validity is indicated by evidence that different indicators of theoretically similar or overlapping constructs are strongly interrelated (Brown & Moore, 2012). It means that the measurement items measuring the same variable will fall on the same factor, emphasizing that the items that should be under the same factor are indeed under the same factor.

Composite reliability (CR) is an important indicator for evaluating the convergent validity of the construct. When CR value > 0.7 can explain the convergent validity of the construct (Cheah et al., 2018).

Average Variances Extracted (AVE) refers to the mean variance explained by structurally loaded items. It is an essential parameter for testing the convergent validity of the framework. When the AVE is more significant than 0.5, the convergent validity of the construct can be explained (Cheung et al., 2023). The results showed that all AVE values in this study were higher than 0.50, and all CR values are higher than the threshold of 0.7, so the convergent validity of this construct can be explained, and the detailed data are in Table 7.

Table 7: Convergence Validity of Confirmatory Factor Analysis

Path		Estimate	S.E.	C.R.	P	Std.Estimate	AVE	CR
OLSE1	<---	OLSE	1			0.804	0.562	0.911
OLSE2	<---	OLSE	0.993	0.07	14.233	***	0.755	
OLSE3	<---	OLSE	1.019	0.085	11.974	***	0.657	
OLSE4	<---	OLSE	0.897	0.064	13.989	***	0.745	
OLSE5	<---	OLSE	0.924	0.065	14.288	***	0.757	
OLSE6	<---	OLSE	0.994	0.074	13.448	***	0.722	
OLSE7	<---	OLSE	0.94	0.064	14.804	***	0.778	
OLSE8	<---	OLSE	0.934	0.064	14.541	***	0.768	
LII1	<---	LII	1			0.716	0.557	0.883
LII2	<---	LII	1.12	0.097	11.496	***	0.714	
LII3	<---	LII	1.069	0.09	11.937	***	0.742	
LII4	<---	LII	1.068	0.088	12.151	***	0.756	
LII5	<---	LII	1.089	0.089	12.294	***	0.766	
LII6	<---	LII	1.093	0.087	12.508	***	0.780	
LCI1	<---	LCI	1			0.710	0.528	0.817
LCI2	<---	LCI	0.988	0.094	10.462	***	0.716	
LCI3	<---	LCI	1.153	0.11	10.453	***	0.715	
LCI4	<---	LCI	1.277	0.117	10.913	***	0.763	
LLI1	<---	LLI	1			0.751	0.561	0.911
LLI2	<---	LLI	0.953	0.076	12.572	***	0.724	
LLI3	<---	LLI	0.911	0.074	12.303	***	0.709	
LLI4	<---	LLI	1.017	0.076	13.386	***	0.766	
LLI5	<---	LLI	0.894	0.071	12.561	***	0.723	
LLI6	<---	LLI	1.051	0.077	13.698	***	0.782	
LLI7	<---	LLI	0.94	0.073	12.928	***	0.742	
LLI8	<---	LLI	1.042	0.075	13.866	***	0.791	
IQ1	<---	IQ	1			0.697	0.508	0.805
IQ2	<---	IQ	1.048	0.1	10.464	***	0.758	
IQ3	<---	IQ	0.936	0.093	10.113	***	0.715	
IQ4	<---	IQ	1.018	0.104	9.743	***	0.679	
TQ1	<---	TQ	1			0.716	0.567	0.839
TQ2	<---	TQ	0.91	0.085	10.757	***	0.697	
TQ3	<---	TQ	1.188	0.099	11.944	***	0.793	
TQ4	<---	TQ	1.267	0.105	12.018	***	0.801	
SS1	<---	SS	1			0.679	0.505	0.836
SS2	<---	SS	1.173	0.109	10.768	***	0.751	
SS3	<---	SS	1.052	0.103	10.204	***	0.700	
SS4	<---	SS	1.063	0.105	10.111	***	0.692	
SS5	<---	SS	1.159	0.11	10.539	***	0.729	
PLP1	<---	PLP	1			0.759	0.558	0.835
PLP2	<---	PLP	0.923	0.079	11.699	***	0.741	
PLP3	<---	PLP	1.072	0.091	11.728	***	0.743	
PLP4	<---	PLP	0.921	0.078	11.741	***	0.744	

Note: ***=p<0.001; **=p<0.01; *=p<0.05

Discriminant Validity

From Table 7, the AVE square roots of each variable are greater than the correlation coefficient which means a good discriminant validity. So the test had discriminant validity, the detailed data are in Table 8.

Table 8: Discriminant Validity

	OLSE	LII	LCI	LLI	IQ	TQ	SS	PLP
OLSE	0.750							
LII	0.326**	0.746						
LCI	0.374**	0.347**	0.727					
LLI	0.272**	0.385**	0.407**	0.749				
IQ	0.356**	0.368**	0.403**	0.454**	0.713			
TQ	0.474**	0.391**	0.445**	0.349**	0.393**	0.753		
SS	0.470**	0.447**	0.461**	0.468**	0.486**	0.469**	0.711	
PLP	0.322**	0.363**	0.404**	0.285**	0.385**	0.436**	0.368**	0.747

Note: The diagonally listed values are the AVE square roots of the variables, * p<0.05 ** p<0.01

Path Analysis and Hypothesis Testing

The SEM of AMOS 24.0 was utilized to test the hypotheses in this study. The overall fit indices of the path model were shown as follows: $\chi^2 = 1113.065$, df = 838, $\chi^2/df = 1.328$, GFI = 0.853, IFI = 0.957, RFI = 0.835, TLI = 0.953, CFI = 0.957, and RMSEA = 0.033, indicating that the model is suitable as they meet the criteria. Path analysis shows the action direction, relationship, and influence degree of variables in the model (Ashaduzzaman et al., 2022). The results of the path analysis of this study are shown in Figure 2, Table 9, and Table 10.

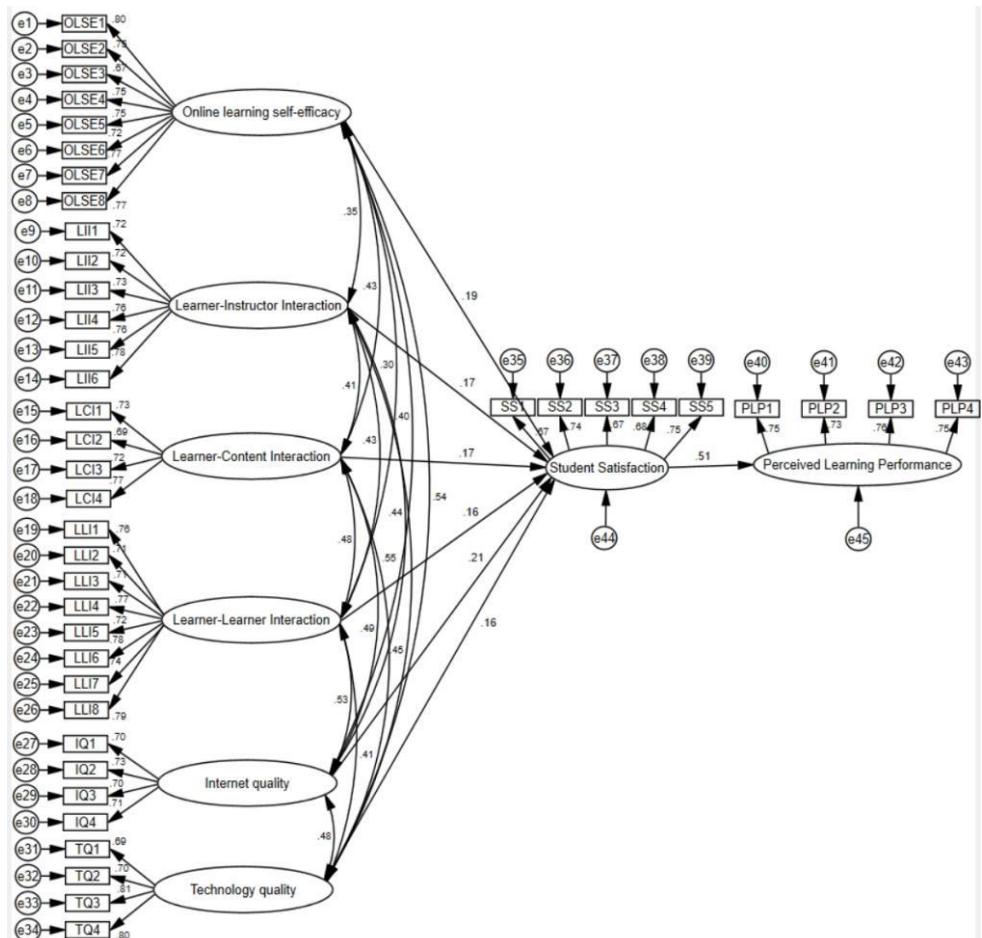


Figure 2: Structural equation modeling result

Table 9: Model Fitting Index

Common index	criterion	value	Fitting situation
CMIN	-	1113.065	-
DF	-	838	-
CMIN/DF	<3	1.328	Good
RMSEA	<0.08	0.033	Good
GFI	>0.90	0.853	Acceptable
IFI	>0.90	0.957	Good
TLI	>0.90	0.953	Good
CFI	>0.90	0.957	Good
RFI	>0.90	0.835	Acceptable
NFI	>0.90	0.847	Acceptable

Table 10: Path Analysis

Path	Estimate	S.E.	C.R.	P	STD. Estimate
OLSE→SS	0.143	0.046	3.135	0.002	0.194
LII→SS	0.144	0.052	2.758	0.006	0.17
LCI→SS	0.124	0.053	2.316	0.021	0.168
LLI→SS	0.095	0.039	2.465	0.014	0.158
IQ→SS	0.172	0.06	2.89	0.004	0.213
TQ→SS	0.117	0.053	2.192	0.028	0.163
SS→PLP	0.782	0.114	6.857	***	0.514

Hypotheses Testing Results

Hypothesis 1: The results shown in Table 10 can be explained that the results of statistical analysis revealed a noteworthy positive correlation between Online Learning Self-Efficacy and Student Satisfaction ($p=0.002<0.01$). The standard estimate (STD. Estimate) value, 0.194, exceeds zero, providing support for Ha1. Consequently, the null hypothesis was rejected.

Hypothesis 2: The statistical analysis outcomes demonstrated a significant positive association between Learner-Instructor Interaction and Student Satisfaction ($p=0.006<0.01$). The STD. Estimate value is 0.17, which is greater than 0, supporting Ha2. Consequently, the null hypothesis was rejected.

Hypothesis 3: The statistical analysis results pointed to a substantial positive correlation between Learner-Learner Interaction and Student Satisfaction ($p=0.014<0.05$), with an STD. Estimate value of 0.158 surpassing 0, Ha3 found support, leading to the rejection of the null hypothesis.

Hypothesis 4: Statistical analysis results illustrated a meaningful positive relationship between Learner-Content Interaction and Student Satisfaction ($p=0.021<0.05$). The STD. Estimated value of 0.168, exceeding zero, provided support for Ha4, leading to the rejection of the null hypothesis.

Hypothesis 5: Statistical analysis findings indicated a significant positive correlation between Internet Quality and Student Satisfaction ($p=0.004<0.01$). The STD. Estimated value of 0.213, greater than zero, supported Ha5, resulting in the rejection of the null hypothesis.

Hypothesis 6: The statistical analysis revealed a noteworthy positive association between Technology Quality and Student Satisfaction ($p=0.028<0.05$), with an STD. Estimate value of 0.163 surpassing zero, Ha6 found support, leading to the rejection of the null hypothesis.

Hypothesis 7: Statistical analysis results highlighted a significant positive correlation between Student Satisfaction and Perceived Learning Performance ($p<0.001$). The STD. Estimated value of 0.514, exceeding zero, provided strong support for Ha7, leading to the rejection of the null hypothesis.

Summary of the Hypothesis Testing

Based on the results of hypothesis testing, the summary of them is shown in Table 11.

Table 11: Summary of Hypothesis testing results

Hypotheses	Statement	p	Result
H ₀₁	There is no significant influence between online learning self-efficacy and student satisfaction	0.002	Rejected
H ₀₂	There is no significant influence between learner-instructor interaction and student satisfaction in the context of learning Chinese online.	0.006	Rejected
H ₀₃	There is no significant influence between learner-learner interaction and student satisfaction in the context of learning Chinese online.	0.021	Rejected
H ₀₄	There is no significant influence between learner-content interaction and student satisfaction in the context of learning Chinese online.	0.014	Rejected
H ₀₅	There is no significant influence between internet quality and student satisfaction in the context of learning Chinese online.	0.004	Rejected
H ₀₆	There is no significant influence between technology quality and student satisfaction in the context of learning Chinese online.	0.028	Rejected
H ₀₇	There is no significant influence between student satisfaction and perceived learning performance in the context of learning Chinese online.	***	Rejected

Note: ***=p<0.001; **=p<0.01; *=p<0.05

The variables were confirmed by the results of CFA and SEM. The study indicates that student satisfaction is positively affected by several factors, including online learning self-efficacy, learner-instructor interaction, learner-learner interaction, learner-content interaction, internet quality, and technology quality. Additionally, results also showed perceived learning performance is positively affected by student satisfaction in the context of learning Chinese online.

Discussion

Discussion with the Quantitative Results

Online learning self-efficacy positively related to student satisfaction in the context of learning Chinese online. This finding is similar to Artino (2008); Gunawardena et al. (2010); Shen et al. (2013); Alqurashi (2018); and Yandra et al. (2021). These five studies all looked at the connection between students' satisfaction and their self-efficacy in online learning. They discovered that the strongest indicator of a student's satisfaction with online learning self-efficacy.

An increase in learner-instructor interaction is associated with an increase in student satisfaction in the context of learning Chinese online. This result aligns with Woods (2002) and Kuo et al. (2014).

There is a positive association between learner-learner interaction and student satisfaction in the context of learning Chinese online. This is in line with the study of Luo et al. (2017). Their research findings indicate that both learner-learner and learner-instructor interactions significantly influence learners' satisfaction.

Learner-content interaction is positively connected to student satisfaction in the context of learning Chinese online. According to Alqurashi's (2018) study, learner-content interaction is the biggest predictor of student satisfaction.

Internet quality and technology quality positively correlated to student satisfaction in the context of learning Chinese online. Technology makes it easier to access a wealth of material, enables interactive and tailored learning, encourages student cooperation, and offers instruments for evaluation and feedback. (Explorance, 2023). These elements have a significant impact on how students learn and consequently on their pleasure. In e-learning settings, insufficient technology, such as poor response times or frequent technical issues, may leave students unsatisfied and lower their performance in online courses (Sun et al., 2008).

Student satisfaction positive interrelation perceived learning performance in the context of learning Chinese online. Keržič et al. (2021) also confirmed it. He discovered that students who express higher satisfaction with their e-learning experience tend to be more satisfied with their studies, which in turn has a positive effect on their perceived academic performance.

Discussion with the Qualitative Results

Data from the interview revealed that students pay more attention to interaction in the learning process, whether it is interaction with teachers or interaction with classmates. Their main complaint is that They are afraid to interact with teachers in the process of online learning and cannot interact with classmates in the process of classroom tasks.

Interview results indicated that the students are satisfied with their online learning experiences, but they do not want to carry out long-term online learning in the future, mainly because they think that online learning lacks the supervision of teachers and insufficient self-control, and they often cannot fully understand the content of online learning. They are still more likely to study offline. They suggested they like to communicate with teachers and classmates.

Recommendations

In online Chinese teaching, teachers should encourage students to develop their self-efficacy and self-control abilities. It is important for teachers to follow up on students' progress and provide opportunities for interaction.

Secondly, when selecting teaching materials for online learning Chinese, it is important to consider the characteristics of this mode of learning. Online teaching should incorporate interactive content that engages students and stimulates their interest in the subject matter.

Thirdly, learners should prioritize online learning, take the initiative to participate, interact more with classmates, and pay attention to real-time interactive learning opportunities in online classes, especially in the absence of a language environment.

When using online teaching, it is important for teachers to have a basic understanding of the teaching platform before instructing students. Additionally, teachers should provide guidance to students on how to use the online learning platform to improve their adaptability to online learning and achieve the best teaching outcomes.

Recommendations for Future Research

As a field of study, there are still some limitations that can be optimized in future research.

Firstly, qualitative methods such as focus groups could be incorporated to provide more in-depth insights.

Secondly, the study could be expanded to cover a wider region, potentially the entire country or a region with many provinces, to obtain a larger and more diverse sample.

Thirdly, longitudinal designs should be used to gain a more comprehensive understanding of satisfaction dynamics and the impact of evolving technology.

Additionally, detailed descriptions of language and cultural backgrounds should be provided, and subgroup analyses should be conducted to explore variations in satisfaction based on these backgrounds.

Finally, students' perception of mastering the skills taught in online classes remains relatively low. Further research is needed to determine how students can effectively apply what they have learned in online classes.

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