



# Factors Influencing Students' Satisfaction with Using Mosoteach for Online Learning in the Culture and Arts Disciplines at Vocational Colleges in Chengdu, China

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## Abstract

**Background and Aim:** With the development of mobile Internet and the popularity of smart terminal devices, online learning platforms such as Mosoteach have been widely used in vocational colleges and universities in China. In the context of student-centered education, the researchers conducted this study to better meet students' online learning needs. This study aimed to explore the factors affecting students' satisfaction with using Mosoteach for online learning in the disciplines of culture and arts in a representative vocational college in Chengdu, Sichuan Province, China. These included computer anxiety, instructor innovation, student engagement, interaction, motivation to learn, and academic self-efficacy.

**Materials and Methods:** The quantitative study used a combination of purposive sampling and stratified sampling to distribute questionnaires to a total of 504 students in the three target disciplines who fulfilled the eligibility criteria and 476 valid questionnaires were returned. For the data collected, the researchers analyzed the reliability, validity, and goodness of fit of the proposed model and tested the hypotheses using Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM).

**Results:** The results of this study showed that student engagement, motivation, and academic self-efficacy had a significant positive effect on satisfaction and that interaction was positively related to student engagement and teacher innovation was positively related to academic self-efficacy. There is no significant relationship between the effect of interaction on student satisfaction and the effect of computer anxiety on student engagement.

**Conclusion:** In the future, vocational colleges and universities should pay more attention to the role of online teaching interactions and instructor innovations in student engagement and students' academic self-efficacy when teaching online for arts and culture students. By enhancing students' engagement, motivation, and academic self-efficacy, they can improve their satisfaction with online learning, thus improving the quality of education.

**Keywords:** Online Teaching; Satisfaction; Mosoteach; Vocational Education

## Introduction

The term online learning first appeared in 1995 with the creation of the web-based system called WebCT, later known as Blackboard. Online learning usually refers to the use of a Learning Management System (LMS) or the distribution of text and PDF files on the Internet (Bates, 2014). Globally, 'online learning' encompasses several related terms such as e-learning, online courses, online education, and blended learning (Singh & Thurman, 2019; Hwang & Tsai, 2011). Educational technology has evolved along with cutting-edge technologies, and history suggests that learner needs should be prioritized and a student-centered approach adopted, i.e. technology should drive human learning (Mayer, 2019). Based on this approach, colleges and universities can understand the advantages and disadvantages of various teaching methods from the perspective of the taught, and find issues to improve teaching and learning more quickly by analyzing student satisfaction and performance.

Online learning in China started in the early 1990s. In the 21st century, the strategy of 'Internet + Education' has promoted the development of online education in China, and various online education platforms have emerged one after another. The 2020 COVID-19 pandemic has accelerated the transformation of education, and colleges and universities have improved their teaching infrastructure, closely integrated mobile Internet with the classroom, and adopted various forms of online teaching, with





significant improvements in the quality of teaching and management. In the post-pandemic era, many colleges and universities are still choosing hybrid modes to meet the different needs of teaching. According to Nakunsong (2024), the integration of digital technology into K-12 education has greatly improved accessibility, flexibility, and individualized learning. However, it has also brought up new issues, such as the digital divide and the inability to adjust to virtual environments. Continuous efforts must be made to address these issues through fair access, strong support networks, and thorough professional development for teachers if we are to fully benefit from digital education. Assuming that these problems are successfully resolved, the continued development of digital education promises to dramatically alter educational experiences. In addition, hybrid learning, which blends in-person and virtual training, offers a flexible and inclusive educational method that may suit a wide range of student requirements and preferences, according to Niyomves et al. (2024). A rich and dynamic learning environment is produced by hybrid models, which combine the accessibility and flexibility of online learning with the quick feedback and one-on-one interaction of in-person sessions. In addition to increasing student engagement and results, this combination gives teachers access to a variety of instructional strategies and technological tools. Last but not least, hybrid learning satisfies the demands of both contemporary students and teachers and is a step forward toward a more individualized and successful education.

The respondents for this survey were selected from a vocational college in Chengdu that has been using Mosoteach as its primary online teaching platform for more than five years. This vocational college has more than 12,000 full-time students and offers 39 majors, including three in the Culture and Arts disciplines: Art and Design, Character Design, and Cultural Creativity and Planning.

## Objectives

The purpose of this study was to examine the factors affecting students' satisfaction with using Mosoteach for online learning in the subject of culture and arts in vocational colleges in Chengdu by determining the relationship between the variables of computer anxiety, instructor innovation, student engagement, interaction, motivation to learn, and academic self-efficacy.

## Literature review

### Mosoteach

Mosoteach is an online teaching platform based on cloud computing and web technology, which is an emerging teaching aid based on mobile internet in the context of education (Miao, 2017). The main functions include course management, online examination, interactive classroom, homework management, and learning resource sharing (Yang et al., 2017).

### Computer Anxiety (CA)

Computer anxiety is the apprehension and uncertainty individuals feel when using computers, manifesting as uneasiness and nervousness about current or future computer use (Parasuraman & Igbaria, 1990). This anxiety includes negative emotions such as nervousness, anxiety, and fear when facing computers (Beckers, 2003). Ouajdouni et al. (2021) found that computer skills were significantly negatively correlated with computer anxiety. In addition, users' attitudes towards computers affect their self-confidence and job performance (Pratiwi & Listiadi, 2021). In contrast, students with higher levels of computer anxiety tend to be more lacking in confidence in their abilities and performance, which affects their engagement (Schlebusch, 2018).

### Instructor Innovation (II)

Teacher innovation refers to the use of diverse and engaging teaching methods that stimulate students' intrinsic motivation to learn, thereby fostering positive attitudes toward learning and enhancing learning effectiveness (Wu, 2002). This concept covers the use of novel teaching strategies by educators, whether or not they are widely used in the teaching community (Andrews & Lemons, 2015). In education, teacher innovation involves improving existing teaching methods and curriculum design to enhance student engagement and promote the development of critical thinking and creative skills (Lee, 2011). This concept



is particularly important in synchronous online learning environments to positively impact student learning outcomes, communication effectiveness, engagement, support, and academic self-efficacy, leading to increased student satisfaction. (Owens et al. 2018).

### **Student Engagement (SE)**

Student engagement refers to the physical and mental resources that students invest in educational activities (Astin, 1984; Kuh, 2003), which consists of three interrelated dimensions: behavioral, affective, and cognitive (Fredricks et al., 2016; Manwaring et al., 2017). McCombs (2017) states that in online learning environments, student engagement is particularly important, and therefore effective course design should be learner-centered. Oliver and Herrington (2003) found that engagement can be optimized through peer-instructor interactions. Singal et al. (2021) argued that high levels of engagement are strongly associated with time commitment, the development of learning mechanisms, and ultimately, increased learning satisfaction.

### **Interaction (IT)**

Interaction is how two or more entities communicate and influence each other (Saffer, 2010). Transactional distance theory emphasizes the importance and effectiveness of interaction (Moore, 1993). In online learning, interaction is crucial in helping learners acquire fresh knowledge and connect with the instructor, peers, and course content to enhance learning outcomes (Baber, 2021). However, technological limitations have long hindered interaction in online education (Downing et al.). Interaction significantly affects student satisfaction, especially early in the course, while interactions between learners contribute to satisfaction and academic achievement (Kurucay & Inan, 2017). However, some studies show that certain types of interactions do not affect satisfaction (Gameel, 2017; Kuo et al., 2014).

### **Learning Motivation (LM)**

Motivation is an intrinsic drive for students to engage in learning and put forth effort, as reflected in their choice of, and commitment to, particular learning activities (Koff and Mullis, 2011). It is widely recognized as playing a key role in the learning experience (Glynn et al.) and facilitates self-directed learning activities that help learners achieve their educational goals, thus promoting holistic growth and development (McIntyre et al. 2023). Erickson et al. (2017) stated that external motivation is crucial in the early and bottleneck stages of learning. As autonomy increases, students' need for external motivation decreases and they will gradually transition to self-directed learning.

### **Academic Self-efficacy (AS)**

Bandura and Wessels (1997) suggest that academic self-efficacy reflects students' expectations for success in the classroom. There are four sources of academic self-efficacy, namely, simulated experience, experiential mastery, verbal persuasion, and physiological and emotional states. Some research suggests that teachers can promote the development of student self-efficacy by supporting these four sources (Abbitt, 2011). In addition, academic self-efficacy has long been recognized as a key factor in social cognitive theory and has a significant impact on student learning outcomes (Schunk & Pajares, 2009). Relevant experimental data suggest a positive correlation between higher academic self-efficacy and higher satisfaction with learning activities (Rashidi & Moghadam, 2014).

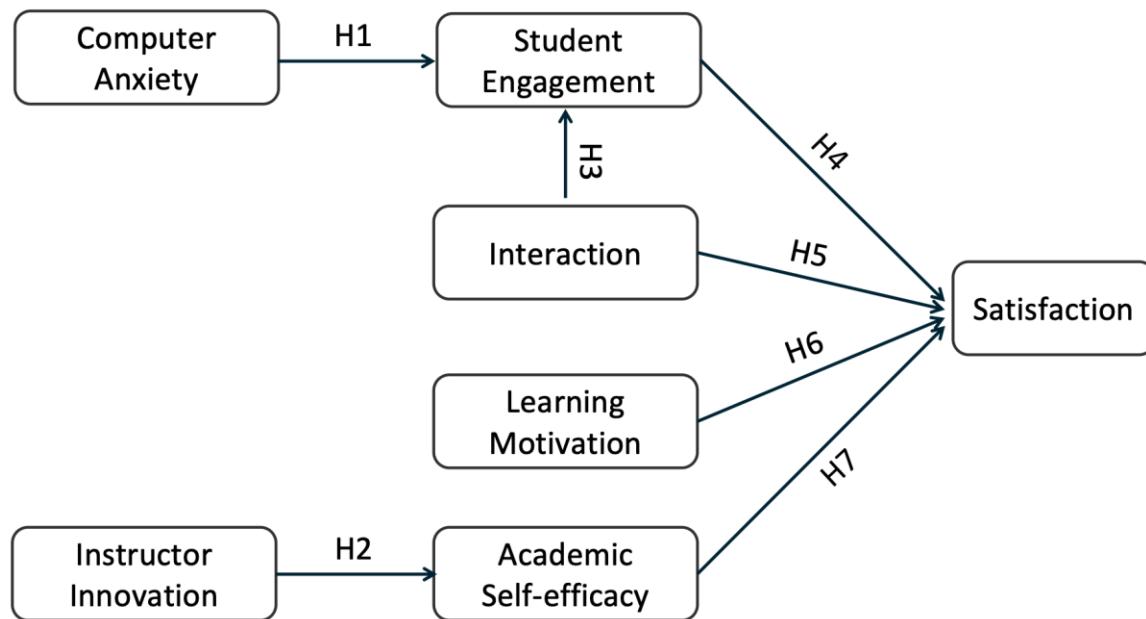
### **Satisfaction (SF)**

In the field of educational research, satisfaction is the transient attitude of students toward learning experiences, services, and facilities (Mukhtar et al, 2015). It is normally assessed by how greatly an individual enjoys the learning process and whether he or she is willing to recommend the course (Lee, 2011). In online learning, satisfaction is seen as a key factor affecting its sustainability and an influential indicator of learning achievement and successful implementation of the system (Parahoo et al. 2016). Palmer and Holt (2009) stated that interaction, engagement, and self-efficacy in an online course are the main factors affecting learner satisfaction. Baber (2020) found that classroom interaction, student engagement, course design, and instructor's sense of innovation positively affect students' learning satisfaction.



## Conceptual Framework

The conceptual framework of this study builds on previous conceptualizations involving seven variables. To construct the conceptual framework, the researcher combined two major theories, SDT and TAM, along with four previous theoretical frameworks. She et al. (2021) proposed a first theoretical framework to illustrate the relationship between the three key components of interaction, student engagement, and satisfaction. Wang et al. (2021) gave a second theoretical framework to demonstrate the relationship between faculty innovation, academic self-efficacy, and satisfaction. Lee et al (2022) presented a third theoretical framework to demonstrate the relationship between computer anxiety and student engagement. Finally, Hettiarachchi et al. (2021) constructed a fourth theoretical framework in which motivation to learn had an impact on satisfaction. Based on the previous theoretical studies, the researcher proposed a conceptual framework as shown in Figure 1.



**Figure 1** Conceptual Framework

The purpose of this study was to investigate the factors that influence the satisfaction of students using Mosoteach for online learning in the Culture and Arts disciplines at a vocational college in Chengdu, Sichuan Province, China, and to analyze the relationships that exist between computer anxiety, instructor innovation, student engagement, interaction, motivation to learn, academic self-efficacy, and satisfaction. Based on the objectives of the study and previous research, the following hypotheses were formulated:

- H01 Computer anxiety has not significantly impacted student engagement.
- Ha1 Computer anxiety has significantly impacted student engagement.
- H02 Instructor innovation has not significantly impacted Academic self-efficacy.
- Ha2 Instructor innovation has significantly impacted Academic self-efficacy.
- H03 Interaction has not significantly impacted student engagement.
- Ha3 Interaction has significantly impacted student engagement.
- H04 Student engagement has not significantly impacted satisfaction.
- Ha4 Student engagement has significantly impacted satisfaction.



H05 Interaction has not significantly impacted satisfaction.  
Ha5 Interaction has significantly impacted on satisfaction.  
H06 Learning motivation has not significantly impacted satisfaction.  
Ha6 Learning motivation has significantly impacted satisfaction.  
H07 Academic self-efficacy has not significantly impacted satisfaction.  
Ha7 Academic self-efficacy has significantly impacted satisfaction.

## Methodology

This study used a quantitative research methodology to comprehensively explore the factors affecting vocational college students' satisfaction with the use of Mosoteach for online learning in the arts and culture discipline. The study focused on variables such as computer anxiety, teacher innovation, student engagement, interaction, motivation, and academic self-efficacy. This study focused on obtaining relevant data through questionnaires and using the software Amos to analyze the data.

### Research Instrument

The survey instrument used in this study was the questionnaire, which was designed by the researcher to be divided into three sections with a total of 39 items. The initial section consisted of screening questions, which served as a mechanism to identify and select the most suitable participants for this study based on their responses. The second section was dedicated to demographic data and relevant personal information was obtained from the participants, thus facilitating a comprehensive overview of the study cohort. The third section was used to answer questions regarding student satisfaction with using Mosoteach for online learning, including observational variables such as computer anxiety, instructor innovation, student engagement, interaction, motivation to learn, academic self-efficacy, and satisfaction.

### Validation of the Research Instrument

Since the participants in the questionnaire were Chinese students, the researchers first translated the original English questionnaire into Chinese. To ensure localization accuracy, the researchers invited two experts who have been working in English translation for more than five years to do the translation. Next, the researchers used the Index of Objective Congruence (IOC) to assess the content validity of the questionnaire. An expert panel consisting of two professors and one associate professor with professional experience in related fields scored 37 items, of which 28 items scored 1.00, six items scored about 0.67, and three items scored about 0.33. After a thorough evaluation, the questionnaire removed three items that scored less than 0. The remaining 34 items had content validity and could be used to achieve the study objectives. Afterward, the researchers assessed internal consistency reliability through the Cronbach Alpha statistic in conjunction with the results of a pilot test with 50 participants who met the study requirements. The results of the analysis showed that the Cronbach alpha coefficient for computer anxiety (CA) was 0.810, instructor innovation (II) was 0.807, student engagement (SE) was 0.896, interaction (IT) was 0.907, learning motivation (LM) was 0.926, academic self-efficacy (ASF) was 0.898, and satisfaction (SF) was 0.905. All the latent variables had Cronbach Alpha values greater than 0.8, indicating a good level of internal consistency of the research instrument, thus validating the reliability of the research instrument.

### Population and Sample Size

The population for this quantitative academic study was students enrolled in the Cultural Arts discipline at a vocational college in Chengdu, Sichuan Province, China, who had at least five months of online learning experience using Mosoteache. The Cultural Arts discipline at this college consists of three major areas of study: art and design, character design, and cultural creativity and planning, and 928 students are currently enrolled in the program. In this study, 476 students were ultimately identified as a valid research sample.

### Sampling method

Purposive sampling combined with Stratified sampling was used as the sampling method in this study. The first step used purposive sampling to select students enrolled in the three majors of Art and Design, Character Design, and Cultural Creativity and Planning in the college who had at least five months



of online learning experience using Mosoteache. The second step involved randomly selecting different percentages of participants by major and year level through stratified sampling, where the number of samples in each stratum was based on that stratum's percentage of the overall population. The sampling arrangement is shown in Table 1.

**Table 1** Sampling Method

Academic disciplines	Major	Grade	Population Size	Sample Size
			=N	≈ (n / 928) *
Cultural and Arts	Art and Design	Freshman	118	64
		Sophomore	157	85
		Junior	86	47
	Character Design	Freshman	103	56
		Sophomore	108	59
	Cultural Creative and Planning	Junior	68	37
		Freshman	118	64
		Sophomore	98	53
		Junior	72	39
<b>Total</b>			<b>928</b>	<b>504</b>

### Data collection and analysis

The researcher generated a link to the questionnaire through the Questionnaire Star platform and sent the link through various class QQ groups while inviting participants to complete the questionnaire. In the end, the researcher distributed the questionnaire to a total of 504 students, and 476 valid questionnaires were returned. Descriptive analyses of the data were carried out using the software Jamovi, while the software AMOS was used to carry out a Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM) to test the hypotheses of the study.

## Results

### Demographic information

A total of 476 valid questionnaires were collected. Among the participants, 59.87% were females and 40.13% were males. In terms of grade level, 35.92% were first-year students, 40.13% were second-year students, and 23.95% were third-year students. Regarding majors, 39.29% of the students majored in Art and Design, 30.46% in Character Design, and 30.25% in Cultural Creativity and Planning. The skewness and kurtosis of the overall data are within acceptable limits, indicating that the data are normally distributed.

**Table 2** Sample Statistical Information

Variable	Category	Frequency	Percentage
Gender	Male	191	40.13%
	Female	285	59.87%
Year of Study	Year 1	171	35.92%
	Year 2	191	40.13%
	Year 3	114	23.95%
Major	Art and Design	187	39.29%
	Character Design	145	30.46%
	Cultural Creativity and Planning	144	30.25%

Variable	Category	Frequency	Percentage
<b>Total</b>		<b>476</b>	<b>100%</b>

### Confirmatory Factor Analysis (CFA)

The researchers used a validation factor analysis (CFA) to test for correlations between latent variables and to assess model fit. CFA is a statistical method used to test for relationships between observed variables and underlying structures and to confirm the consistency of the expected factor structure based on theory or prior research (Mueller & Hancock, 2001). Table 3 shows the results of the validation factor analysis, composite reliability, and mean-variance extraction.

**Table 3** Confirmatory Factor Analysis Result (AVE, CR, etc.)

Variables	Path	Standardized factor loadings	SE	P	CR	AVE
Computer Anxiety	CA1 <--- CA	0.836			0.823	0.540
	CA2 <--- CA	0.658	0.053	***		
	CA3 <--- CA	0.713	0.053	***		
	CA4 <--- CA	0.720	0.055	***		
Instructor Innovation	II1 <--- II	0.734			0.895	0.685
	II2 <--- II	0.892	0.058	***		
	II3 <--- II	0.950	0.057	***		
	II4 <--- II	0.709	0.062	***		
Student Engagement	SE1 <--- SE	0.831			0.931	0.691
	SE2 <--- SE	0.843	0.046	***		
	SE3 <--- SE	0.849	0.045	***		
	SE4 <--- SE	0.800	0.047	***		
	SE5 <--- SE	0.815	0.046	***		
	SE6 <--- SE	0.849	0.042	***		
Interaction	IT1 <--- IT	0.939			0.889	0.730
	IT2 <--- IT	0.700	0.044	***		
	IT3 <--- IT	0.905	0.037	***		
Learning Motivation	LM1 <--- LM	0.825			0.932	0.663
	LM2 <--- LM	0.801	0.042	***		
	LM3 <--- LM	0.820	0.041	***		
	LM4 <--- LM	0.795	0.042	***		
	LM5 <--- LM	0.839	0.043	***		
	LM6 <--- LM	0.834	0.040	***		
	LM7 <--- LM	0.784	0.040	***		
Academic Self-efficacy	AS1 <--- AS	0.903			0.865	0.689
	AS2 <--- AS	0.584	0.044	***		
	AS3 <--- AS	0.954	0.046	***		
Satisfaction	SF1 <--- SF	0.813			0.924	0.633
	SF2 <--- SF	0.807	0.051	***		
	SF3 <--- SF	0.826	0.054	***		
	SF4 <--- SF	0.832	0.046	***		
	SF5 <--- SF	0.724	0.045	***		
	SF6 <--- SF	0.788	0.045	***		



Variables	Path		Standardized factor loadings	SE	P	CR	AVE
	SF7	<---	SF	0.776	0.048	***	

Remark: CR = Composite Reliability, AVE = Average Variance Extracted

### 1. Convergent Validity

The study tested construct validity through convergent validity. Hair et al. (2009) indices, with factor loadings  $> 0.5$  and average variance extracted (AVE)  $> 0.5$ , were used.

The results in Table 4 show that all constructs had AVE values ranging from 0.540 (Computer Anxiety) to 0.730 (Interaction), exceeding the cutoff value of 0.5, demonstrating passing convergent validity. Additionally, composite reliability (CR) also showed satisfactory levels, with all values  $> 0.7$ .

### 2. Discriminant Validity

Before the structural equation model analysis, the discriminant validity of each construct is tested. As suggested by Fornell & Larcker (1981), discriminant validity can be evaluated by comparing the correlation coefficient of each construct with the square root of the Average Variance Extracted (AVE). The square root of AVE needs to exceed the correlation coefficient of the construct, ensuring that discriminant validity has been established.

**Table 4** Discriminant Validity Correlation Matrix

	II	AS	SF	LM	IT	SE	CA
II	<b>0.828</b>						
AS	0.252	<b>0.830</b>					
SF	0.161	0.117	<b>0.976</b>				
LM	0.399	0.127	0.179	<b>0.814</b>			
IT	0.157	0.047	0.137	0.212	<b>0.855</b>		
SE	0.342	0.022	0.183	0.445	0.287	<b>0.831</b>	
CA	-0.294	-0.182	-0.124	-0.195	-0.326	-0.134	<b>0.735</b>
AVE	0.685	0.689	0.633	0.663	0.730	0.691	0.540

As shown in Table 5, on the diagonal of the correlation matrix is the square root of the AVE for each latent variable, while off the diagonal is the correlation coefficient between the latent variables. The data indicate that all AVE square root values are greater than the correlation coefficients between the latent variables and the other latent variables, thus demonstrating discriminant validity between the constructs.

### 3. CFA Model Fit

Concerning Marsh et al. (2005), it can be argued that the criteria for satisfactory model fit are CFI  $\geq 0.9$ , TLI  $\geq 0.9$ , and RMSEA in the range of 0.05 to 0.08. A high level of goodness of fit requires a CFI  $\geq 0.95$ , a TLI  $\geq 0.95$ , and an RMSEA of less than 0.05. The results of the present CFA model fit indices indicate that all the fit criteria have been achieved at a good level. As shown in Table 5 other fitting metrics such as CMIN/DF, NFI, GFI, and AGFI are also able to meet the corresponding requirements.

**Table 5** CFA Fit Indices

Fit Index	Acceptable Criteria	Source	Statistical Values
CMIN/DF	< 3	Kline (2023)	1.585
RMSEA	< 0.08	Marsh et al. (2005)	0.035



Fit Index	Acceptable Criteria	Source	Statistical Values
CFI	$\geq 0.90$	Marsh et al. (2005)	0.972
TLI	$\geq 0.90$	Marsh et al. (2005)	0.969
NFI	$\geq 0.90$	Marsh et al. (2005)	0.929
GFI	$\geq 0.90$	Marsh et al. (2005)	0.913
AGFI	$\geq 0.80$	Sica & Ghisi, (2007)	0.898
Model Summary			In harmony with empirical data

### Structural Equation Modeling (SEM)

Structural Equation Modeling (SEM) is a statistical technique used to analyze complex relationships between multiple variables, both observed and underlying structures. To test the proposed hypothesis of causal relationships between variables, the researchers used Structural Equation Modeling (SEM) in their analysis.

The researcher checked the model fit of the structural model using fit indices such as Standardised Root CMIN/DF, Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), and Normed Fit Index (NFI).

**Table 6** Fit Indices Results of the Structural Equation Model

Fit Index	Acceptable Criteria	Source	Statistical Values
CMIN/DF	$< 3$	Kline (2023)	1.973
RMSEA	$\leq 0.10$	Marsh et al. (2005)	0.045
CFI	$\geq 0.90$	Marsh et al. (2005)	0.953
TLI	$\geq 0.90$	Marsh et al. (2005)	0.949
NFI	$\geq 0.90$	Schermelleh-Engel et al. (2003)	0.909
Model Summary			In harmony with empirical data

The analysis results revealed the following fit indices values: CMIN/DF = 1.973, RMSEA = 0.045, CFI = 0.953, and TLI = 0.949, NFI = 0.909. The current model fit analysis was consistent with the empirical data.

### Research Hypothesis Testing

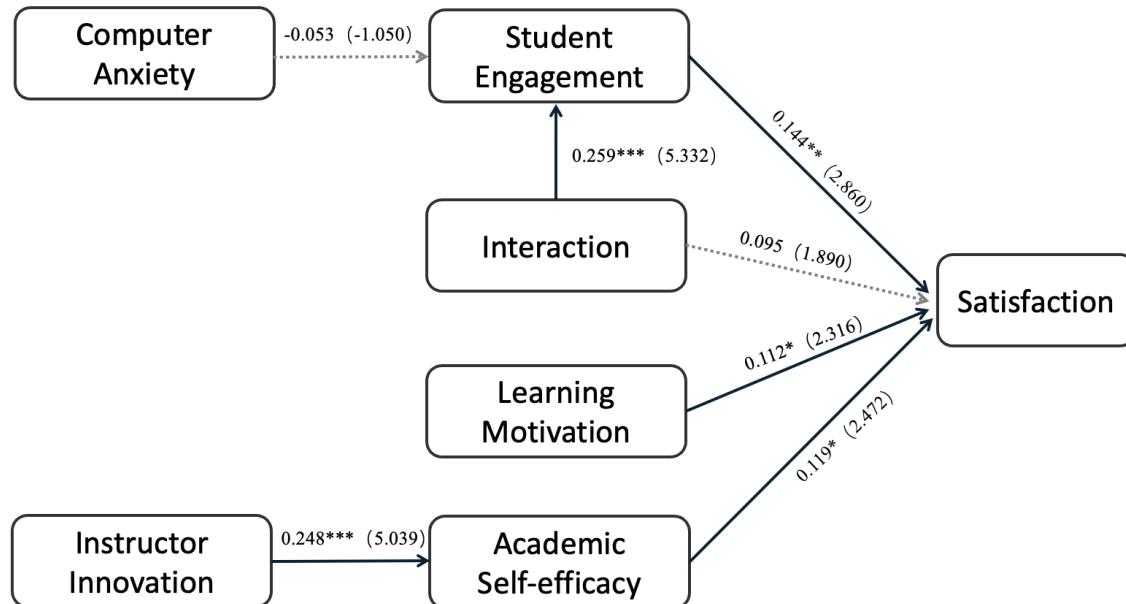
Table 7 shows the results of the hypothesis testing for the Structural Equation Modeling. Based on the results, a summary of hypothesis testing from Hypothesis Ha1 to Hypothesis Ha7 is included.

**Table 7** Hypothesis Testing Results of the Structural Equation Model

Hypothesis	Standardized Coefficients ( $\beta$ )	T-value	Result
Ha1: Computer anxiety (CA) has significantly impacted student engagement (SE).	-0.053	-1.050	Not Supported
Ha2: Instructor innovation (II) has significantly impacted Academic self-efficacy (AS).	0.248	5.039***	Supported
Ha3: Interaction (IT) has significantly impacted on student engagement (SE).	0.259	5.332***	Supported

Hypothesis	Standardized Coefficients ( $\beta$ )	T-value	Result
Ha4: Student engagement (SE) has significantly impacted on satisfaction (SF).	0.144	2.860**	Supported
Ha5: Interaction (IT) has significantly impacted on satisfaction (SF).	0.095	1.890	Not Supported
Ha6: Learning motivation (LM) has significantly impacted on satisfaction (SF).	0.112	2.316*	Supported
Ha7: Academic self-efficacy (AS) has significantly impacted on satisfaction (SF).	0.119	2.472*	Supported

\*\*\*=p<0.001; \*\*=p<0.01; \*=p<0.05.



Note: \*\*\*=p<0.001; \*\*=p<0.01; \*=p<0.05. The T-values are in parentheses

**Figure 2** The SEM Path Diagram of the Study

### Mediation Effects Test

The researcher tested the model for mediation effects using the Bootstrap method with the software AMOS, which focuses on determining whether there is a significant mediation effect between the variables. First, the significance of the mediation effect was determined by checking whether the confidence interval in each path contained 0. If the confidence interval contains 0, the mediation effect is not significant; if the confidence interval does not contain 0, the mediation effect is significant. Second, the p-value in Bootstrap was also checked to ensure that  $p < 0.05$  to confirm the significance of the mediation effect.

**Table 8** Mediating Effects Test

Path	Effect	Estimate	Standard Error	P	95%CI	
					Lower	Upper
IT → SE → SF	Indirect Effect	0.000	0.013	0.003	0.012	0.060
	Direct Effect	0.076	0.043	0.063	0.014	0.152
	Total Effect	0.106	0.044	0.009	0.037	0.183
CA → SE → SF	Indirect Effect	-0.006	0.070	0.216	-0.021	0.002
	Direct Effect	0.000	0.000	0.323	0.000	0.000
	Total Effect	-0.006	0.070	0.216	-0.021	0.002
II → AS → SF	Indirect Effect	0.025	0.012	0.014	0.007	0.050
	Direct Effect	0.000	0.000	0.000	0.000	0.000
	Total Effect	0.025	0.012	0.014	0.007	0.050

The above results can be summarised mainly as :

1. *Significant Indirect Effects*: Both the IT → SE → SF and II → AS → SF paths show statistically significant positive indirect effects, indicating that SE and AS act as mediators in these relationships.

2. *Mediating effects are not significant*: the CA → SE → SF path does not show significant mediating effects, suggesting that changes in CA do not affect SF via SE, and likewise do not directly affect SF.

## Conclusion

This study revealed the factors affecting the satisfaction of students using Mosoteach for online learning in the discipline of culture and art at Chengdu Vocational College in Sichuan Province, China. The findings showed that student engagement, motivation, and academic self-efficacy had significant positive effects on satisfaction. In particular, student engagement was positively influenced by interaction, while academic self-efficacy was positively influenced by teacher innovation. This suggests that vocational colleges should pay more attention to interactivity and innovative educational approaches when using Mosoteach for online teaching and learning in the future to motivate and enhance students' engagement and academic self-efficacy and try to gradually increase students' motivation to learn, which turn will improve their online learning satisfaction.

In addition, this study found that interaction did not have a significant direct effect on student satisfaction. Combined with previous research, it is clear that in some online education scenarios, although interaction is crucial, it is not sufficient by itself to directly enhance student satisfaction. Also under the conditions of this study, the researcher found that computer anxiety did not have a significant effect on student engagement. However, it is clear from the data that there may be a potential inverse relationship between computer anxiety and student engagement, except that in some online learning situations, computer anxiety by itself does not directly affect actual student engagement.

## Discussion

1. *Why was there no significant correlation between computer anxiety and student engagement in this study?*

The vast majority of studies on the relationship between computer anxiety and student engagement tend to hypothesize that computer anxiety negatively affects student engagement. However, this hypothesis was not confirmed in this study and warrants a deeper analysis. Considering the characteristics of the sample, the researchers concluded that the results may have been influenced by the participants' majors and



level of computer use. First, the students who participated in the survey majored in cultural arts disciplines, had frequent access to computers, and had been taking related courses since their freshman year. As described by Christensen & Knezek (2008), the effect of computer anxiety on engagement was not significant for students who were familiar with technology. Second, Sam et al. (2005) also mentioned that students who are adaptable to using technology do not experience a significant impact on engagement. Especially after the COVID-19 epidemic, students at all grade levels had at least two years of online learning experience and already had some familiarity and comfort with online instructional technology. Also, Chu & Spires (1991) noted that computer anxiety primarily affects students in the early stages, while high-frequency computer users have been able to effectively control their anxiety. Therefore, this may be the reason why there was no significant correlation between computer anxiety and student engagement in this study.

## 2. Why is there no significant correlation between interaction and learning satisfaction in this study?

Regarding the correlation between interaction and learning satisfaction, most studies have shown that interaction usually has a positive impact on learning satisfaction. However, some studies and scholars have made some noteworthy points, for example, a study by Ebner and Holzinger (2005) noted that some learners, especially those who prefer self-directed learning, may prefer less interaction and become frustrated with demanding interaction. Kuo et al. (2013) conducted a study on online learning and found that although interaction is important, it is not always the main determinant of learning satisfaction. The results of the study showed that interaction between students did not affect student satisfaction. In some cases, students who preferred self-directed learning reported being satisfied even without a high level of peer or instructor interaction. Research by Garrison and Cleveland-Innes (2005) has previously shown that simple interaction may not be enough to influence learner satisfaction. Interaction significantly affects learning satisfaction only when it has depth, is relevant to learning goals, and promotes higher levels of cognitive processing.

## Recommendation

### Practice Recommendation

Based on the findings of the study, the following recommendations for improvement in conducting online learning in vocational colleges are aimed at better meeting student needs and enhancing satisfaction with online learning platforms in future online education. These recommendations also provide clear directions for instructional design and platform optimization.

#### 1. Enhancing interaction in online learning to increase student engagement

Increasing student engagement is the key to improving satisfaction. Instructional design should focus on employing highly interactive strategies to stimulate student interest and enhance classroom engagement. To achieve this goal, the following measures are recommended:

The first step is to enrich the interactive form of online teaching. It is recommended that online teaching platforms such as Mosoteach develop more diverse interactive tools and make good use of existing functions such as instant feedback, online grouping, and resource sharing to enhance the interactivity of online learning.

Secondly, the analysis and optimization of interactive data should be done well. Teachers should make good use of the user interaction data recorded on the platform and analyze and optimize it to organize teaching activities more effectively.

Finally, teachers should strengthen the guidance of student participation. Teachers should actively participate in online course discussions and exchanges to create a positive and encouraging learning atmosphere so that students are willing to actively participate in the learning process.

#### 2. Motivate students through internal incentives and external rewards.

Motivation is one of the most important factors affecting the satisfaction of online learning. To effectively stimulate students' intrinsic motivation, the following measures are suggested:



Firstly, moderate online learning tasks should be designed, including challenging tasks that encourage independent inquiry and problem-solving, to motivate students to gain a sense of achievement when solving problems and realizing internal motivation.

Secondly, external rewards such as credits and prizes should be used appropriately to enhance learners' motivation, though in moderation to avoid over-reliance on external rewards and weakening their intrinsic desire to learn.

### 3. Using innovative teaching measures to improve students' academic self-efficacy

High self-efficacy usually leads to higher levels of academic satisfaction, and as instructors play an important role in enhancing this, it is recommended that the following improvements be implemented:

Firstly, instructors should aim to create a collaborative and supportive environment that promotes mutual support and growth among students, thereby enhancing their perceptions of their abilities.

Secondly, instructors can introduce creative and innovative online teaching tools and activities to make the whole process interesting and challenging, so that students can experience a sense of accomplishment after completing the tasks.

Finally, online courses should adopt diversified evaluation methods and provide timely and positive feedback and encouragement, especially in recognizing their efforts and progress, to enhance their self-confidence and academic self-efficacy.

### Future Research Recommendation

After taking into account the limitations of the survey and other factors, the researcher suggested three recommendations for future studies: 1. Develop more objective and standardized questionnaires that can be completed anonymously. Include questions from multiple perspectives to allow for a comprehensive analysis, randomize the order of questions, and use various statistical tools and cross-validation for multivariate data analysis. 2. Consider key variables to improve model construction by accounting for mediating and moderating variables, using hierarchical modeling to explore relationships at different levels. Compare different models to find the most suitable one for explaining the phenomenon. 3. Increase the sample size and use diverse data sources to reduce bias. Expand the scope of the survey to enhance its generalizability. These steps will improve the quality and reliability of future research efforts.

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