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Influences of Online Classes on Chinese Students' Satisfaction Amid Covid -19

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Abstract

The purpose of this study is to determine the characteristics that influence student satisfaction with online learning during the COVID-19 epidemic and the linkages among them. The research was a quantitative in nature and the data was collected through an online survey of 166 respondents who were taking an art and design course at universities in Guilin, China. The offered hypotheses were examined using structural equation modelling. Partial least squares (PLS) were used to validate the measurements and hypotheses, while confirmatory factor analysis (CFA) was utilized to validate both. The empirical findings indicate that student satisfaction with online learning is not primarily influenced by the calibre of the teachers. The findings also show that the expectations of the students and the course's design have a big impact on how satisfied students are with online learning. Teachers and school administrators can use the survey results as a guide and a point of reference when making choices.

Keywords: COVID-19, Online Education, Influences of Online Classes, Student's Satisfaction

Introduction

At the end of 2019, a new type of coronavirus pneumonia broke out in Wuhan (Shereen et al., 2020). The first coronavirus mortality outside of China was recorded on February 2, 2020. On March 11, 2020, the World Health Organization declared a pandemic epidemic that was spreading across continents. The global death toll topped a hundred thousand in April (Mosher, 2020). COVID-19 has required significant changes to school policy to comply with government policies (Fotheringham et al., 2021). The global proliferation of COVID-19 resulted in the suspension of lessons for over 850 million children globally, altering the original teaching plans of schools in various countries and areas.

National public administration offices, government ministries, and agencies responded quickly to guide regional and local school administration bodies. To prevent the spread of the pandemic and to ensure the normal operation of the teaching system, all universities and institutions have implemented online teaching methods to carry out instructional activities. Soon after, numerous countries began to offer online teaching to students via Zoom, Google Meetings, FaceTime, and other similar services (Chen et al., 2020). On February 6, 2020, the People's Republic of China's Educational Ministry declared that it would fiercely support

information-based education and teaching and expand the platform's service capacity to support online teaching. Chinese universities and institutions choose Ding Ding, Tencent Class, Chinese MOOC and other software to start online education.

Online Education platforms have become an important tool in providing education to maintain the stable operation of the education system during COVID-19. However, Online Education is not the same as traditional education; because the epidemic compelled all institutions to conduct large-scale online teaching activities, this change did not provide teachers and students time to prepare. As of December 25th, 2022, due to the arrangements of the Chinese government's epidemic prevention work, some universities in China have been once again required to conduct online teaching. With such a long period of online learning, we must rethink whether traditional education is irreplaceable. And it is necessary ~~for us~~ to study the implementation of online education during the epidemic. Hence the main goal of this study is to determine the factors that influence students' satisfaction with online course instruction during COVID-19. By analyzing the data, determine the problems in the school's teaching work; and create workable strategies for teachers to enhance the caliber of instructional activities and student learning and assist the school administration. At the same time, it also provides some reference ideas for the development of online education in the post COVID-19 era.

This study focuses on the perceptions of online learning among Chinese students during the Covid-19 pandemic. The study looked at three independent variables: the quality of instructor, course design, and students' expectations with students' satisfaction as the dependent variable. These factors were chosen because they were known to affect students' satisfaction. The study's objective was to clarify the relationship between these variables and students' satisfaction with online learning.

Literature Review

The review of the literature is primarily divided into two sections. The review of the literature is primarily divided into two sections. The first section is to elicit the study hypotheses for online education. In the second part, we begin by summarizing the potential elements influencing student satisfaction; secondly, we summarize the relevant research that affects student satisfaction in the process of online learning, as well as the summary of diversified research on student satisfaction.

Online Education Theory

Distance education began in the nineteenth century at the University of Chicago in the United States; the original concept was that students from different locations would try to communicate with one another. The idea of online education has progressively come to pass as a result of technological advancement. The invention of television in the 1950s made it possible for educators and students to engage in visual learning activities for the first time without regard to the physical location. Bates (1997) discussed why we should pick online education to bring about change for the learning, students, and consequences for the specialist open learning and distance education units while outlining some of the implications of technology progress for open and remote learning. The distance education model started to proliferate with the introduction of computers in the 1970s (Sun & Chen, 2016). The first fully online courses were introduced in 1981, and the first group of online undergraduate and graduate courses was successfully submitted in the middle of the 1980s. The World Wide Web (WWW), which first appeared in 1991, makes it possible to spread online education across

the globe. As a result, online education research has increasingly become the focus of scholars, and many theoretical and practical study outcomes have been obtained. Academics presently accept theories Community of Inquiry (CoI), Connectivism, and Online Collaborative Learning as three mature theories for online education (OCL). Based on these theories, scholars have also tried to explore theoretical models.

Community of Inquiry (CoI): The Community of Inquiry (CoI), which was created in 2000 by Garrison, Anderson, and Archer, is founded on the idea of three separate "presences": cognitive, social, and teaching. Their methodology advocates for the design of online and blended courses as active learning environments or communities based on instructors and students exchanging ideas, facts, and opinions.

Connectivism: The connectivism model recognized significant changes in how knowledge and information move, develop, and change as a result of extensive data communications networks. Learning has changed from personal, individualistic activities to group, communal, and even crowd activities thanks to internet technology. Siemens defines connectivism as follows: learning (defined as actionable knowledge) can exist outside of ourselves (inside an organisation or a database), it is focused on connecting specialised information sets, and the connections that enable us to learn more and are more significant than our existing state of knowledge (Siemens, 2004). Siemens stated that the dynamic of information flow is what propels connectivism as a notion.

Online Collaborative Learning (OCL): A hypothesis put forth by Linda Harasim (2012) called online collaborative learning (OCL) focuses on the capabilities of the Internet to offer learning settings that promote cooperation and knowledge building. Harasim describes OCL as: a new philosophy of learning that focuses on collaborative learning, knowledge development, and Internet use as a tool to redefine formal, non-formal, and informal education for the Knowledge Age (Picciano, 2021). Three stages of group discourse-based knowledge production are identified by OCL: “step1: Idea generation: the brainstorming stage, where many ideas are brought together. step2: Idea organization is the process of comparing, analysing, and categorising ideas through debate and argument. step3: Intellectual convergence: the stage in which ideas are synthesised and agreed upon, including when disagreements are allowed, typically through the creation of a joint assignment, essay, or other piece of work” (Harasim, 2012, p. 82).

Research on Student Satisfaction

Numerous challenges are emerging with the development of society, and the importance of education has been deeply recognized. Education professionals know that student happiness has evolved into a crucial quality assurance component due to the increasingly intense competition in the higher education market. This also stimulated the theoretical exploration of scholars on student satisfaction.

Factors influences student satisfaction: It is possible to link the research of customer satisfaction to that of students. But unlike customer satisfaction, student satisfaction is defined as a continuous process of improvement and adjustment as higher education advances. In addition, the factors affecting students’ satisfaction are diversified. For instance, student happiness is multidimensional and depends on how clearly the student's goals are stated, according to Hartman and Schmidt (1995). According to Grossman (1999), trust has a big effect on happiness. According to Athiyaman (1997), student satisfaction is a result of the perceived quality of the educational experience. Kevin (2021) found that student-centeredness, campus climate and instructional effectiveness strongly impact students'

satisfaction with their overall educational experience. And In order to attract and retain students, universities must identify and meet student expectations. In the study of students' satisfaction, many scholars believe that student satisfaction is the evaluation of a university education quality standard; and student satisfaction is one of the important standards to measure the service quality of colleges and universities. Satisfaction Research on Online Education: With the development of online education, some researchers wonder whether the factors affecting student satisfaction are the same between the online and traditional education models. Swan (2001) conducted an online survey to study this issue. She wanted to find out the factors affecting student satisfaction with and perceived learning from online education. The survey finding indicated that three universal characteristics, design clarity, teacher involvement, and active conversation among course participants, greatly influenced students' satisfaction and perceived learning. Such discoveries are connected to various forms of interactivity and an online learning approach called "community of inquiry".

Satisfaction Research on Online Education: In higher education, online education is gaining more and more impact. There are many modes of online education, such as E-learning, blended class and flipped learning. With the development of online education, some researchers wonder whether the factors affecting student satisfaction are the same between the online and traditional education models. Swan (2001) conducted an online survey to study this issue. She wanted to find out the factors affecting student satisfaction with and perceived learning from online education. The survey finding indicated that three universal characteristics, design clarity, teacher involvement, and active conversation among course participants, greatly influenced students' satisfaction and perceived learning. Such discoveries are connected to various forms of interactivity and an online learning approach called "community of inquiry".

Some scholars from online education models view to discuss the students' satisfaction. In an effort to determine whether format produces the best learning outcomes, creates the most satisfied students, or has the highest rate of course completion, Anne-Mette Nortvig (2018) compared face-to-face instruction versus online learning and/or blended learning. He discovered that there are many factors, but some stand out more than others, including educator presence in online settings, interactions between students, teachers, and content, and planned connections between online and offline activities as well as between activities related to the campus and those related to practise (Nortvig et al., 2018). In addition, Anh-Nguyet Diep and his colleagues surveyed to study different blended learning (BL) modes and how technological and human elements combine to affect student satisfaction. And they found that, when combined with instructor expertise under various BL situations, the learning management system (LMS) quality has a noticeably diverse impact on student satisfaction (Diep et al., 2016). In his 2017 article, Ramazan Yilmaz examined how the students' readiness for e-learning is related to issues with student motivation and satisfaction in the flipped classroom (FC) style of instruction. He said that while using the FC education model, students' preparation for e-learning strongly predicted their pleasure and motivation (Yilmaz, 2017). Student satisfaction and perceived learning in online learning environments have been significantly influenced by a variety of factors including course organisation and structure, student engagement, learner interaction, and instructor presence. This study added to the body of knowledge already available on online education and the factors affecting learner happiness and perception (Gray & DiLoreto, 2016).

Diverse Research on Student Satisfaction: Through literature review, it can be found that some scholars study from diversified perspective to analyze the research on student

satisfaction Such as, Chandra (2019) used data analysis to determine the influence of service quality and university image on student satisfaction and student loyalty. Grealish and Henderson (2018) conducted semi-structured interviews approach to determine students' satisfaction with learning; they indicated that Students are pleased with their learning when they have a rewarding learning path. Each student's level of pleasure with their education is different, fluctuates over time, and may be minor or intense. This study is quite innovative, because previous research on students' satisfaction mainly focused on students' perception of the educational environment, and rarely analyzed students' satisfaction with learning from the subjective perspective of students (Smith et al., 2018). The results of this study would fill in the gaps in theoretical research and offer a workable route for future theoretical research.

Research Model and Hypotheses

As the hypothesized path model illustrates above (Figure 1), multiple hypothesized variables impact students' satisfaction with online education.

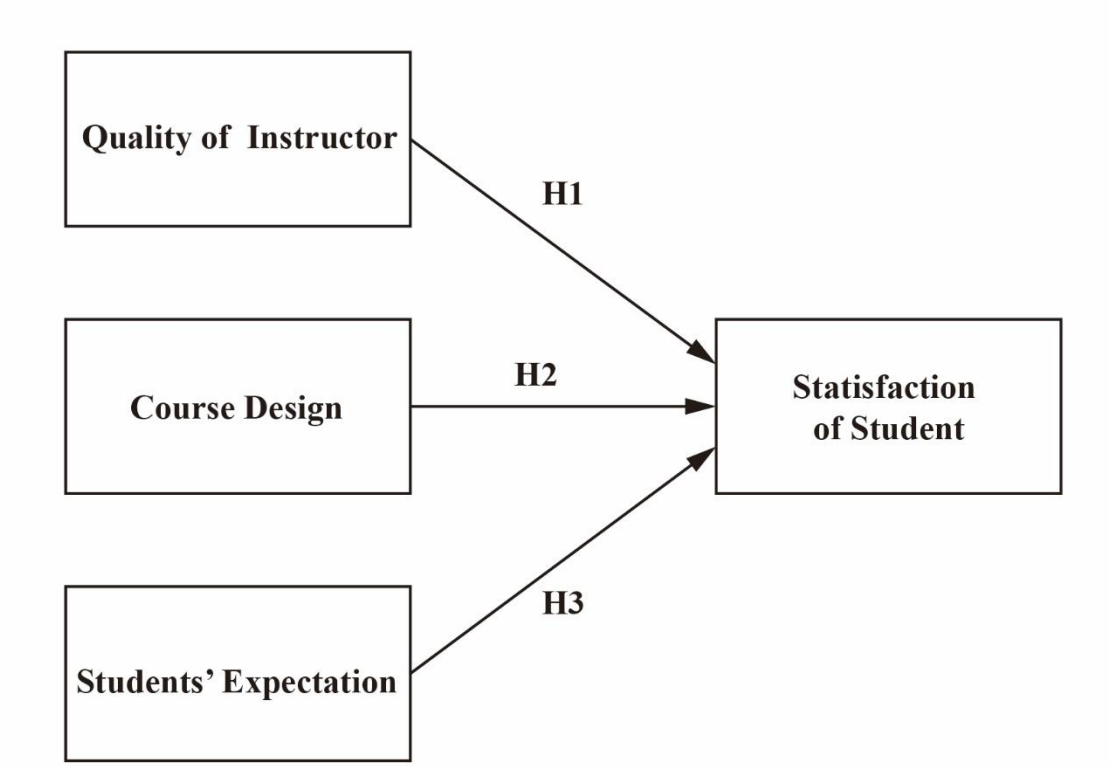


Fig 1. The research model for satisfaction of student

Student satisfaction is positively impacted by high-calibre instructors who are passionate about their students' learning. One of the most important factors influencing student satisfaction and the success of the educational process is the calibre of the instructor (Gopal et al., 2021 ; Munteanu et al., 2010; Arambewela & Hall, 2009; Ramsden, 1991). Hence, we still regard the quality of instructor as a mainly factors to affect the students' satisfaction was measured in this study.

H1: The quality of instructor (QOI) is a factor that mainly affects the students' satisfaction and positively affects the satisfaction of students (SO).

The process and strategy of developing excellent learning settings and experiences for students is known as course design. Students can access knowledge, gain skills, and develop

higher levels of thinking through deliberate and planned exposure to instructional materials, learning activities, and interaction Effective course design is supported by the fact that the courses themselves serve as the basis for both teaching and learning. More students will be able to engage in richer learning opportunities that promote successful learning thanks to an efficient design. As a result, the study contained the hypothesis that the course design greatly affects students' satisfaction.

H2: Course design (CD) positively affects the satisfaction of students (SO).

The expectation is a significant element that directly affects the student's satisfaction. The amount of satisfaction based on their expectations was assessed using the Expectation Disconfirmation Theory **(EDT)** (Oliver, 1980; Schwarz & Zhu, 2015). The best method to increase student satisfaction is to meet their expectations. Therefore, this study includes the hypothesis that student expectations have a major impact on satisfaction.

H3: Students' expectation (SE) positively affects the satisfaction of students (SO).

Method

This study collected data from 166 respondents who were studying art and design courses at Chinese universities. The interviewed colleges and universities are mainly concentrated in Guilin. Descriptive statistics show that boys accounted for (42.26%) and girls accounted for (57.74%). All respondents have received online education during COVID-19.

The research instrument consists of two sections. The first section is related to demographical variables such as gender and discipline; The second section measures the four factors which are the quality of instructor, course design, student expectations and students' satisfaction. These attributes were taken from previous studies (Gopal et al., 2021; Yin & Wang, 2015; Bangert, 2004; Chickering & Gamson, 1987; Wilson et al., 1997), and adjusted for relevance in this study.

The scale created by Bangert (2004) was used to evaluate the "quality of the instructor". There are six items on the scale. Two of the questions on the "course design" scale were modified from Gopal et al (2021), while the remaining items were derived from (Wilson et al., 1997; Bangert, 2004). Four items made up the "Student's expectations," three of which were derived from Bangert (2004) and one from Gopal et al (2021); five items made up the "satisfaction of student." While others were obtained from Wilson et al (1997) and Yin & Wang, three of them were modified from (Bangert, 2004; Yin & Wang, 2015). These characteristics were examined on a five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). This study has only included participation from Chinese pupils. In the study, a total of twenty-two questions were posed to determine the impact of the first three variables on student satisfaction. For full details of the questionnaire, kindly refer Appendix (Tables 3).

The respondents in this study were chosen at random. They were made aware of the investigation's goal and the procedure for acquiring data; respondents were not required to provide their names during the questionnaire collection process. They received guarantees about the privacy of the data and received no compensation for taking part in the study. The survey was created using the SOJUMB software and distributed over WeChat or Tencent QQ; Respondents can fill out the questionnaire by mobile phone or computer. Sampling mainly came from two universities in Guilin, Guangxi, China. Universities across the nation offered teaching during the outbreak. Respondents not only experienced a 2-month e-learning at the time of the COVID-19 outbreak. Additionally, respondents continued to study online from December 5, 2022, to December 20, 2022, due to modifications in China's COVID-19

prevention policy. A total of 200 questionnaires were circulated, out of which the students returned 168 and deleted the two questionnaires that had not been completed. 166 valid questionnaires were c

Results

For the first phase, a Confirmatory Factor Analysis (CFA) was performed on a data set with 166 cases and no missing values. The aim of the analysis was to evaluate the reliability, validity, and correlations between the latent variables of quality of instructor (QOI), course design (CD), student's expectations (SE), and satisfaction of student (SO).

The data was analyzed using SPSS, AMOS and SmartPLS software. The CFA results showed that the measurement model fit the data well with X2/df ratio of 3.140, RESEA of 0.114, and GFI of 0.785. The AGFI and CFI were also relatively high at 0.720 and 0.887, respectively. The IFI and TLI values of 0.888 and 0.867, respectively, also supported a good fit. From table1, we observe that the values of RESEA and AGFI are not very ideal. The reason for this could be the insufficient sample size.

As table 2 shown that the Cronbach alpha ranges from 0.876 to 0.932, indicating good reliability~~. And~~ the average variance extracted (AVE) values were 0.619 for QOI, 0.756 for CD, 0.719 for SE, and 0.788 for SO, respectively. The average square root of AVE values was 0.733 for QOI, 0.831 for CD, 0.793 for SE, and 0.857 for SO, respectively. AVE quantifies the variance that a latent construct captures, or the variance that is explained. It displays the relationship between the measurement error attributable to each individual construct and the sum of the measurement item variance as retrieved by the construct. According to conventional wisdom, each construct's square root of the AVE should be greater than the correlation of that particular construct with any of the other constructs in the model (Chin, 1998), and Table 3's results demonstrate that every construct satisfies this standard.

These values suggested that the variables had a good level of internal reliability. The inter-construct correlations between the constructs were significant. QOI had a high positive correlation with CD (0.293, p<.01) and SE (0.325, p<.01). CD had a high positive correlation with SE (0.330, p<.01) and SO (0.317, p<.01). SO also had a high positive correlation with SE (0.383, p<.01).

The results of the CFA indicate that the measurement model fits the data well and that the constructs have a good level of internal reliability and significant inter-construct correlations. The AVE values suggest that the variables have a good level of internal reliability. The high inter-construct correlations indicate that the latent variables are related to one another.

Table 1
Goodness of Fit

X2/df	RESEA	GFI	AGFI	CFI	IFI	TLI
3.140	0.114	0.785	0.720	0.887	0.888	0.867

Table 2
Result of confirmatory factor analysis

Construct	Items	Composite reliability	AVE	Cronbach's Alpha
Quality of instructor (QOI)	6	0.888	0.619	0.876
Course design (CD)	4	0.904	0.756	0.893
Student's expectations (SE)	4	0.911	0.719	0.869
Satisfaction of student (SO)	5	0.934	0.788	0.932

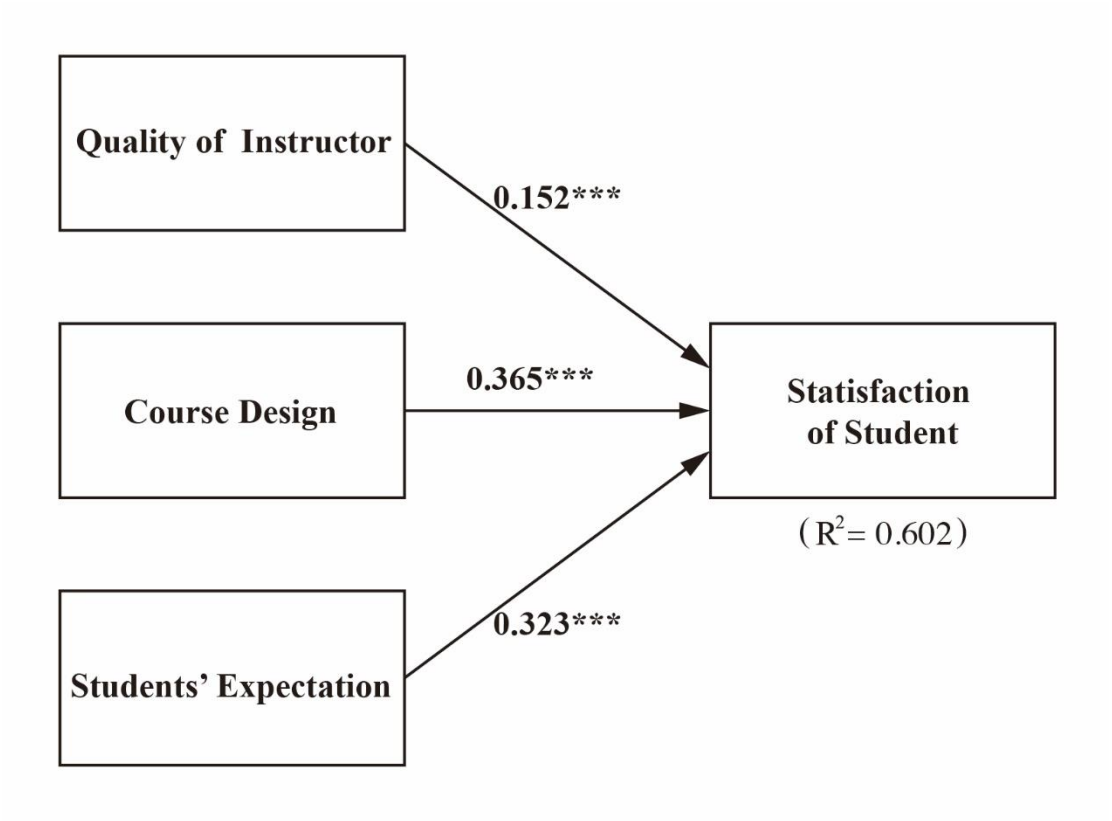
Table 3
Validity Analysis of Measurement Model

	QOI	CE	SE	SO
QOI	**0.619**			
CD	0.293***	**0.756**		
SE	0.325***	0.330***	**0.719**	
SO	0.310***	0.317***	0.383***	**0.788**
AVE Square Root	0.788	0.869	0.848	0.888

The bold diagonal value represents AVE (AVE is the Average Variance Extracted) **QOI** means quality of instructor; **CD** means course design; **SE** mean Student's expectations; **SO** means Satisfaction of student.

Discussion

The structural model was evaluated in the second phase of the statistical analysis to confirm whether or not the relationships indicated by the proposed model were consistent with the existing data. R square values are evaluated in a similar way to multiple regression analysis results. They show how much of the construct's volatility can be accounted for by the path model (Barclay et al., 1995). They show how much of the construct's volatility can be accounted for by the path model (Barclay et al., 1995). According to the findings, the model was able to account for 60.2% of the variation in students' satisfaction. The relationship between instructor quality and student happiness is 0.152. Meanwhile the relationship between course design and student satisfaction is 0.365; and between student expectations and student satisfaction is 0.323. The strength and statistical significance of these path coefficients provide additional support for the nomological validity of the research model. The path coefficients indicate that there is a positive and statistically significant relationship between each of the predictor variables (quality of instructor, course design, and student expectations) and satisfaction of student. The standardised path coeffficients and path significances are shown in Figure 2 and Table 4. The findings demonstrate that, at $P < 0.05$, all three anticipated connections were very significant, and the results provide support for the hypothesis H1, H2 and H3. However, it is interesting to note that the path coefficient from quality of instructor to satisfaction of student is 0.152, indicating that as the quality of instructor increases, satisfaction of student also tends to increase, albeit to a relatively small degree; course design has a stronger positive effect on satisfaction of student compared to quality of instructor. These findings suggest that improving course design and meeting or exceeding student expectations may have a stronger impact on satisfaction of student than improving the quality of instruction alone.



* P<0.05 **P<0.01 ***P<0.001
Fig 2. PLS analysis results

Table 4
Summary of hypotheses test

	Hypotheses	β	p-Value	Support
H1	Quality of Instructor (QOI) g Satisfaction of Student (SO)	0.152	_***	Yes
H2	Course Design (CD) g Satisfaction of Student (SO)	0.365	_***	Yes
H3	Students' Expectation (SE) g Satisfaction of Student (SO)	0.323	_***	Yes

Standardized estimates are shown * P<0.05 **P<0.01 ***P<0.001

Conclusion

In response to the COVID-19 pandemic, all institutions conduct large-scale online teaching activities to maintain the operation of the educational system. The study gathered information on the experiences of students who took classes online for two months during the COVID-19 outbreak and again for a short period in December 2022 when China's pandemic prevention and control policy was adjusted. The authors evaluated many aspects of students' satisfaction with online courses. The findings of this study will help educational decision-makers decide how to raise student satisfaction with online learning while also providing as a guide for teachers to raise student satisfaction in online learning.This study considered three factors that are closely related to students' learning satisfaction, as shown in Figure 2. The estimated value of the student satisfaction structure is 0.602 (R^2=60.2%), indicating that it is directly and indirectly affected by factors such as quality. Teacher,

curriculum design and student expectations. Therefore, on the whole, the model has strong explanatory power for students' online learning satisfaction. Significant path coefficients, effect magnitudes, and R square values all increase our confidence in the hypothesis test results.

The empirical results show that instructors' quality did not significantly affect student satisfaction with online learning, and course design and student expectations are two strong determinants of student satisfaction in online learning. These results question the widespread notion that teacher quality is the primary influence on students' satisfaction with online learning.This contrasts with earlier findings that teacher quality is a major factor affecting student satisfaction (Gopal et al., 2021; Munteanu et al., 2010; Arambewela and Hall, 2009; Ramsden, 1991). Our findings indicate that course design provides the most contribution to student satisfaction. This suggests that instructors should think about how to design their courses. The traditional course design mode, such as simply using PPT to display the course content, may not be suitable for the online learning mode. Teachers should take full advantage of multimedia presentations and flexibility in designing lessons. High-quality courses can significantly affect student learning satisfaction.

In general, the research significance of this study mainly has two aspects. First, this discovery offers fresh viewpoints and ideas for improving online instruction. The formulation of educational policies and teachers can be used as a reference. This accomplishment contributes to the theoretical study of higher education's digital revolution and the growth of online learning. Also, based on empirical research, this study offers valuable suggestions, such as focusing on curriculum design, experimenting with multimedia presentations and more adaptable teaching techniques, prioritising meeting students' expectations and requirements, etc. This study suggests viable paths that are grounded in reality. Although our study provides insights into the factors that determine student satisfaction with online learning, it has some limitations that also represent opportunities for future research. Firstly, the analysis was based on a sample of 166 participants from a university in Guilin, China, which limits the generalizability of the results to other countries and cultures. Future research should collect samples from different countries, cultures, and backgrounds to confirm and refine the findings of this study. Secondly, the sample size is also a limitation, as more participants could improve the reliability and generalizability of the results. Therefore, future research could increase the sample size and diversity to better understand the determinants of student satisfaction with online learning.

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Appendix

Table 4

Instrument

VARIABLES	QUESTION	Source
	Q1: gender	
	Q2: What is your major?	
	Q3: Are you interested in your current major?	
Quality of instructor	QOI_Q4: Was the teacher enthused about online instruction?	Bangert (2004)
	QOI_Q5: Was the instructor thinking about the students' education?	
	QOI_Q6: Was the instructor thinking about the students' education?	
	QOI_Q7: Besides the online course, was the instructor reachable to me?	
	QOI_Q8: Did the instructor use Webinar to set up a welcoming learning environment?	
	QOI_Q9: When necessary, did the instructor personalise interactions with me?	
Course design	CD_Q10: Does the teacher clearly explain the course objectives?	Bangert (2004)
	CD_Q11: Does the teacher clearly state the course requirements?	
	CD_Q12: Whether the teacher arranges the teaching content reasonably?	
	CD_Q13: Do you believe an effective learning environment was created during the webinar?	(Gopal et al., 2021)
Student's expectations	SE_Q14: Did the instructor clearly assign the weekly course work?	Wilson et al. (1997)
	SE_Q15: Did the instructor use good examples to explain concepts?	
	SE_Q16: Do you think the assignments for this course were of appropriate difficulty level?	
	SE_Q17: Do you think the instructor used webinar design instructional materials that were understandable?	
Satisfaction of student	SO_Q18: Do you think the online classes were valuable?	Bangert (2004)
	SO_Q19: Do you think Taking online classes increased your interest in Art Design?	
	SO_Q20: Do you think online classes improved your understanding of Art Design?	
	SO_Q21: Do you typically have enough time to comprehend the material you need to learn?	
	SO_Q22: Do you think online learning is the best learning experience?	Yin and Wang (2015).