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Studying Factors Influencing Intention to Use Hybrid Education: A Case Study of Visual Communication Design Major Students at Chengdu Vocational University of Art

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Abstract

Background and Aim: Hybrid teaching follows the reform trend of China's vigorous development of online education and hybrid education. The Chengdu Vocational University of Art is the earliest art vocational university in China, and the visual communication major is the advantageous major of the university. The program of this major adopts a hybrid education model combining MOOC online courses and offline education. This study uses TAM, ASCI, UTAUT, and ECM theories to construct a model to analyze the factors affecting the hybrid education learning satisfaction of visual communication students, whose variables include virtual classroom quality, instructor characteristics, student expectations, course design quality, and course content quality.

Materials and Methods: A purposive sampling method was used to distribute questionnaires to 571 students. Confirmatory factor analysis (CFA) and Structural Equation Modeling (SEM) were used to analyze the reliability, validity, goodness of fit, and hypothesis testing of the model.

Results: Student satisfaction was found to greatly influence intention to use through the study. In addition, instructor characteristics and classroom quality had a supportive relationship on perceived usefulness, student expectations, course content, and perceived usefulness had a supportive relationship on satisfaction, while course design quality had no significant effect on satisfaction.

Conclusion: School management and teaching teams should pay attention to the key influences on the intention of hybrid education and design programs based on research findings to help students understand the effectiveness of hybrid education and improve the quality of education.

Keywords: Hybrid Education; Art Careers; Visual Communication; Satisfaction; Intentions

Introduction

Over the past five years, online programs in Chinese universities have grown rapidly, with a dramatic increase in the number of users. in April 2020, the number of online education users in China peaked at 423 million, but declined slightly by June 2021, totaling 325 million. Affected by the new crown epidemic, colleges and universities continue to adjust their online and offline teaching methods, and hybrid education is highly favored. In the field of education research, "online-offline combination (OMO) ", "MOOCS" and "hybrid learning" have become popular keywords for nine consecutive years.

The educational technology platform used in this study is MOOC courses, which are Massive Open Online Courses. The MOOC aims to provide high-quality course resources to a large number of students worldwide. Gu (2013) argues that catechism courses are considered one of the most significant innovations in the field of education since the printing press, introducing a revolutionary model of education, and are seen as a bright future educational prospect. Yuan and Liu (2014) suggest that this

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fully online learning model provides students with opportunities for self-directed learning, and the course content includes multimedia educational resources such as video lectures, online quizzes, and forum discussions, providing a rich learning experience. Sun (2014) Most MOOC courses offer learning opportunities for free, with paid options for obtaining certification or additional support. The diversity of MOOCs covers a wide range of disciplines and fields, providing opportunities for students and professionals to acquire knowledge and skills.

The Chengdu Vocational University of Art is the first art vocational university approved by China's Ministry of Education. Visual Communication is the school's advantageous major, with high enrollment and a wide range of employment opportunities, and it is a highly applied art and design major. Some high-quality courses of the Visual Communication major use hybrid education combining MOOC online classes and offline courses. The characteristics of hybrid education in Visual Communication are as follows: first, the multimedia approach of hybrid teaching combines video, audio, graphics, and interactive sessions, which is suitable for the professional characteristics of the students in this major; second, hybrid teaching integrates digital tools and information technology required for visual communication design; and third, the hybrid teaching provides self-paced options and online access to meet the flexibility of student's choice of study time and the scientific nature of performance assessment; fourth, the advantages of hybrid education combine online theoretical knowledge learning with offline practical skills classes, which is helpful for the students of this major in advertising design, brand visual design, and digital visual design in combining theory and practice perfectly. Therefore, the study of the factors affecting student satisfaction in the hybrid course of visual communication at the Chengdu Vocational University of Art can not only provide good suggestions for the improvement of the hybrid course of this major but also provide a reference for the curriculum planning of the hybrid courses of art and design majors in other universities.

Objective

Using MOOC as a platform, this study integrates MOOC content and related technologies with traditional classrooms (Wang & Feng, 2019) to create an online-offline hybrid teaching model. The goal of the study is to investigate and study the hybrid education implementation intention of visual communication design students at the Chengdu Vocational University of Art.

Literature Review

Online-offline Hybrid Education

Online-offline hybrid education, also known as "hybrid teaching" or "integrated education," is an educational model that combines traditional face-to-face education with online education, aiming to give full play to the advantages of both and provide a more flexible, personalized, and effective learning experience (Liu, 2020). This model is critical to the field of higher education as students are seeking more flexible and convenient learning options, and universities are actively exploring ways to utilize classroom resources and educational technologies better to facilitate learning and improve the quality of education (Robertson, 2014).

Instructor Characteristics (IC)

Bhuasiri et al. (2012) and Ahmed (2010) defined instructor characteristics of hybrid courses in their study in this way. Instructor characteristics include timely response, technical knowledge, confidence, and innovativeness that enable the Instructor to encourage students to learn in hybrid

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courses. Ahmed (2010) concluded that instructor characteristics directly affect learners' acceptance of hybrid courses by conducting a valid questionnaire survey on 538 university students. Bhuasiri et al. (2012) concluded that a teacher's attitude toward technology and teaching style directly affects learners' performance and effectiveness. The study concluded that Instructor Characteristics include timely response, self-efficacy, control of technology, interactivity, attitude toward students, and fairness (Arbaugh, 2000).

Virtual Classroom Quality (VCQ)

E-learning quality is defined as the extent to which technology provides a suitable learning environment for learners. This includes user interface design, reliability, usability, and service quality (Pham et al., 2019). Al-Busaidi (2013) argues that hybrid versus virtual learning environments allow the instructor to control the course design and utilize multi-platform web resources to enhance the face-to-face learning environment. The classroom environment is virtual and real. Hybrid learning can address the shortcomings of face-to-face and virtual learning environments.

Student Expectation (EXP)

Before the implementation of hybrid education, the courses related to hybrid learning, teachers' introduction, word of mouth, and learners' previous learning experience will all affect the Learner's expectations (Gao, 2018). Gao (2018) used Fornell's model of testing consumer satisfaction for the analysis of factors influencing student satisfaction in hybrid courses. He argued that before conducting a hybrid course, faculty introduction about the hybrid course, word of mouth from regular users, and learners' previous experiences about the hybrid course will influence learners' expectations about the course. Fornell et al. (1996), in the ASCI model, consider the customer's expectation of the product; this expectation represents the customer's experience of previous consumption of the company's product and also includes non-experiential information acquired by the company through advertisements, word-of-mouth from consumers, etc. So, consumer expectations are characterized by forward and backward-looking.

Course Design Quality (CDQ)

Refers to whether the design and implementation of the hybrid education system meet certain standards and expectations to ensure that students can receive high-quality education and training (Lee et al.,2009; Liu et al.,2010).

The content and format of the design of a hybrid course play an important role in the learning outcomes of the learners. Liu et al. (2010) argued that the quality of the design of an online course is a key factor in determining the success or failure of learning. The quality of course design will enhance learners' ease of use and usefulness of the course. Roca et al. (2006) in their paper stated that the quality of information, quality of service, and quality of the system are important in course design, such as timeliness, scope, relevance, and accuracy directly affecting learner satisfaction.

Course Content Quality (CCQ)

The quality of course content includes the richness of the content and the regularity with which the content is updated (Lee, 2006), and commonly used indicators for evaluating the quality of course content are the quality of the information and the quality of the system, as well as the quality of the content and the form of the learning reports generated for the hybrid education system (DeLone &McLean, 2003).

Lee (2006) concluded from his study that content richness has a positive impact on learner satisfaction. Hybrid education has the advantage of being able to provide learners with rich learning

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resources through the Internet, which is more attractive to learners. The Internet also facilitates instant uploading and downloading of up-to-date learning resources so that learners have regular access to up-to-date learning content.

Perceived Usefulness (PU)

Perceived usefulness is defined as the degree to which an individual believes that using a particular system would enhance his or her performance (Davis, 1989). Fang et al. (2016), in their paper, expressed that the perceived ease of use of information technology affects not only the acceptance intention but also the perceived usefulness of users. Learners are more willing to choose an efficient course to learn if the course with the same teaching content takes less time and effort to get the same teaching effect. Kester (2007) argues that the more users of online courses know about the characteristics of online teaching and online teaching functions, and the more they know about online teaching techniques, the greater the perceived usefulness.

Satisfaction (S)

Users' satisfaction with the hybrid education system can lead to their continuance intention (Pham et al.,2019). Davis and Venkatesh (1996) showed that perceived usefulness and perceived ease of use affect user satisfaction, which directly influences users' willingness to use.

Users' satisfaction with the hybrid education system can lead to their continuance intention of the system (Davis,1989). Refers to an individual's or organization's tendency or plan to use resources, take action, or perform a behavior in a specific future situation (Al-Busaidi,2013).

In conclusion, online and offline hybrid education is widely used in today's university programs, especially those that emphasize the integration of theoretical knowledge and practice. The success of hybrid education depends on factors such as instructor characteristics, virtual classroom quality, student expectations, course design and content quality, perceived usefulness, satisfaction, and intention to use. These factors influence the flexibility, personalization, and effectiveness of the student learning experience, which plays a crucial role in the provision of personalized and effective educational programs in higher education institutions.

Conceptual Framework

The conceptual framework for this study was constructed based on three existing theoretical frameworks. The researcher used four theories, including ECM, ASCI, TAM, and UTAUT, as well as three prior theoretical frameworks to help construct the conceptual framework. Cheng (2020) developed the first theoretical framework, which feeds into the relationship between three variables of ECM (e.g., Course Content Quality, Course Design Quality, and Satisfaction). Alrousan et al. (2021) developed the second theoretical framework, which illustrated that Instructor Characteristics, Virtual Classroom Quality, and Perceived Usefulness are variables that affect Satisfaction, and Satisfaction affects Intentions to use. The third theoretical framework that determines the impact of Student Expectation on Satisfaction, is the Satisfaction of Intentions to use.

The above study is based on three theoretical frameworks that integrate all the variables related to this study into one conceptual framework. As shown in Figure 1, this conceptual framework demonstrates the causal relationship between the variables and is designed to help us understand the intention of the students to use it for the hybrid education of the visual communication design program at Chengdu Vocational University of Art.

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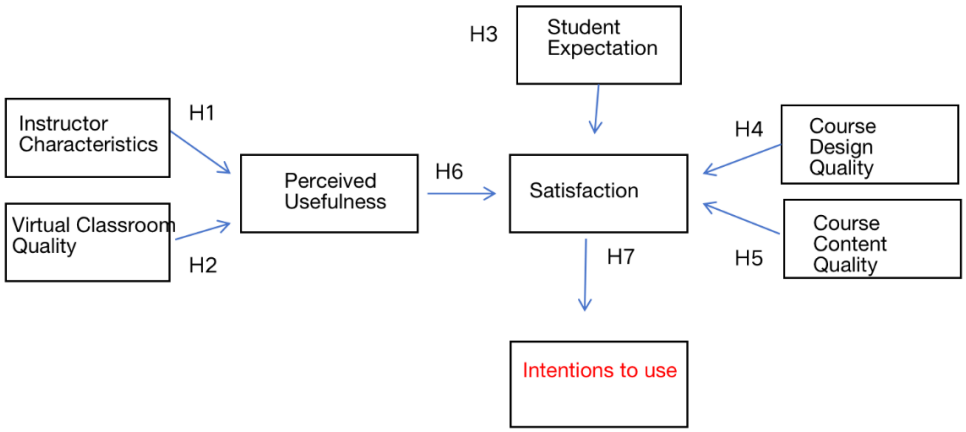

Figure 1 Conceptual Framework

In this study, eight basic variables were considered in exploring the factors affecting the implementation intention of the hybrid education students of the visual communication design program at the Chengdu Vocational University of Art: Course Content Quality, Course Design Quality, Instructor Characteristics, Virtual Classroom Quality, Student Expectation, Perceived Usefulness, Satisfaction, and Intentions to use. In addition, the study further explored the causal relationship between these variables to identify the determinants that influence the behavioral intentions to use. Based on the objectives of the study and previous research, the following hypotheses were formulated:

$H_0$1: Instructor Characteristics do not have a positive effect on Perceived Usefulness

Iha1: Instructor characteristics have a positive effect on Perceived Usefulness.

$H_0$2: Virtual Classroom Quality does not have a positive effect on Perceived Usefulness.

H_a2:Virtual Classroom Quality has a positive effect on Perceived Usefulness.

$H_0$3:Student Expectation does not have a positive effect on Satisfaction

H_a3:Student Expectation has a positive effect on Satisfaction

$H_0$4:Course Design Quality does not have a positive effect on Satisfaction

H_a4:Course Design Quality has a positive effect on Satisfaction

$H_0$5:Course Content Quality Has a Positive Effect on Satisfaction

H_a5:Course Content Quality has a positive effect on Satisfaction

$H_0$6:Perceived Usefulness Has a Positive Effect on Satisfaction

H_a6:Perceived Usefulness has a positive effect on Satisfaction

$H_0$7:Satisfaction has a positive effect on Intentions to use

H_a7:Satisfaction has a positive effect on Intentions to use

Methodology

Based on the MOOC platform, this study combines MOOC content and related technologies with traditional classroom teaching to investigate the intentions of visual communication design students at the Chengdu Vocational University of Art in implementing a hybrid education program. This study utilizes quantitative methods to collect data on students' intention to use.

Research Instrument: In this study, quantitative analysis was used to collect data by applying purposive sampling, and a questionnaire was administered to undergraduate students majoring in visual communication at the Chengdu Vocational University of Art. An online questionnaire was used, and

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the questionnaire consisted of three parts: I. Screening questions refer to identifying specific questions in a set of questions or categorizing or ranking questions according to certain conditions (Hair et al., 2013). II. Demographic information is the study of the number, composition, distribution, and change of the population (Salkind, 2017). III. Factors affecting students' intention to use hybrid education. The third part of the questionnaire, with twenty-nine observed variables are: items 1-4 show Instructor Characteristics; items 5-8 demonstrate Virtual Classroom Quality; items 9-12 show Student Expectation; items 13-16 show Course Design Quality; Items 17-19 show Course Content Quality; Items 20-22 show Perceived Usefulness; Items 23-25 show Satisfaction; Items 26-29 show Intentions To Use. Students indicate their attitude by giving certain scores according to their actual situation.

Validation of the Research Instrument: Data collection for this study was conducted in two steps. The first step was a trio of two professors, associate professors, and one professor with doctoral titles, two of whom were experts with experience in fields related to art and design and one expert in the field of pedagogy, Turner & Carlson (2003), to conduct the Index of Objective Coherence (IOC) test before data collection. According to the three experts, the average score was calculated to arrive at the validity of the questionnaire content. Eight latent variables and 29 observed variables with a maximum score of 1 and a minimum score of 0.67, so the 29 items in the questionnaire were valid. The reliability was then tested by administering the electronic questionnaire to a small sample of people using Cronbach's Alpha Reliability (CA) as an indicator. The value of Cronbach's alpha usually ranges between 0 and 1, with higher values indicating higher internal consistency of the measurement instrument (Traub & Rowley, 1991). Typically, Cronbach's alpha values between 0.7 and 0.9 are considered to be good consistency, while below 0.6, improvement may be needed, and below 0.5, the design of the measurement instrument is re-examined. Hair et al. (2007) suggested that each value above 0.7 can be considered acceptable. In this study, 44 valid questionnaires were screened, data were analyzed, and all results and reliability tests were presented based on the preliminary validated internal consistency reliability.

Table 1 *Results of Cronbach's Alpha of the research instruments*

Latent Variables	Items No.	Cronbach's Alpha
Instructor Characteristics	4	0.887
Virtual Classroom Quality	4	0.882
Student Expectation	4	0.882
Course Design Quality	4	0.895
Course Content Quality	3	0.883
Perceived Usefulness	3	0.856
Satisfaction	3	0.881
Intentions to use	4	0.913

Data Collection and Analysis: After a consistent assessment of the validity and reliability of the content to undergraduate students of visual communication at the Chengdu Vocational University of Art, 571 valid questionnaires were collected, and the statistical tools Jamovi and AMOS were used to analyze the data. In addition, discriminant validity was assessed using a validated factor analysis (CFA), which included the steps of extracting the average variance (AVE), calculating the composite reliability (CR), determining the factor loadings, and assessing the t-values. Subsequently, Structural Equation

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Modeling (SEM) was used to test the research hypotheses and delve into the direct, indirect, and combined effect relationships among the variables. This helped us to understand the correlations and effects between the variables in a more comprehensive manner.

Population and Sample Size: The respondents of this study were undergraduate students majoring in visual communication at the Chengdu Vocational University of Art. According to Israel (1992), the minimum sample size required for a complex research framework in structural equation modeling should be above 200 participants. In this study, a total of 755 respondents were surveyed, and then, through screening, filtering, and selection according to specific quotas, 571 students were finally identified as the final sample of the study.

Sampling Strategy: The purposive sampling was to recruit a total of 755 students from freshmen to seniors and require them to have at least one month of experience in a hybrid education course. These students ended up being the sample population for our study. All 755 students participated in the survey, but after validation, the data were valid for 571 of them.

Table 2 Sample unit and sample size

University	Students population	% of population	Sample Size
Freshman	251	28.9%	165
Sophomore	172	25%	143
Junior	136	23.3%	133
Senior	196	22.8%	130
TOTAL	755	100%	571

Results

Demographic Information

Table 3 summarizes the demographic information of the 571 participants. There were 165 male students, or 28.9% of the total, and 406 female students, or 71.1% of the total number of students. There were 114 students, or 20% of the students, between the ages of 16-18, 268 students, or 46.9% of the students, between the ages of 19-20, 174 students, or 30.5% of the students, between the ages of 21-22, and 15 students, or 2.6% of the students, between the ages of 23-24. The demographics of the participants are summarized in Table 3. Table 3 shows the demographics of the 571 participants. There were 165 students (28.9%) in the first grade, 143 students (25%) in the second grade, 133 students (23.3%) in the third grade, and 130 students (22.8%) in the fourth grade. Multiple choice questions on the use of software, of which 204, or 18.40%, chose WeChat; 290, or 26.20%, chose MOOC; 349, or 31.60%, chose Ding Talk; 81, or 7.30%, chose Tiktok; and 182, or 16.50%, chose others.

Table 3 Sample demographic information and basic information statistics

Variable	Form	Frequency	Percentage
A visual communications major	Yes	571	100%
Hybrid education learning experiences in the curriculum	Yes	571	100%
Gender	Male	165	28.9%
	Female	406	71.1%

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Variable	Form	Frequency	Percentage
	Utter	571	100%
Year of Study	First-year	165	28.9%
	Second year	143	25%
	Third year	133	23.3%
	Fourth-year	130	22.8%
Age	16-18years old	114	20
	19-20years old	268	46.9
	21-22years old	174	30.5
	23-24years old	15	2.6
	Utter	571	100%

Sports Event	Form	Responsive	Percentage of cases	
		Number of cases	Percentage	
What software/app is normally used	WeChat	204	18.40%	35.70%
	MOOC	290	26.20%	50.80%
	Ding Talk	349	31.60%	61.10%
	Tiktok	81	7.30%	14.20%
	Other	182	16.50%	31.90%
Total		**1106**	**100.00%**	**193.70%**

Confirmatory Factor Analysis (CFA)

Confirmatory factor analysis (CFA) is a statistical analysis of survey data, a method used to test whether the relationship between a factor and the corresponding observed variable is consistent with the researcher's preconceived theoretical relationship (Malhotra et al., 2004). The research aims to test the consistency of the theory with the data from the theoretical hypotheses to test and eventually develop the theory (Brown, 2015). Based on the criteria of Hair (2010) et al. and the actual values presented in Table 4, it can be confirmed that all the goodness-of-fit indicators showed to be very effective in the assessment of confirmatory factor analysis (CFA). These metrics include the chi-square value to degrees of freedom (CMIN/DF), goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI), CFI, TLI, NFI, and root mean square error of approximation (RMSEA).

Table 4 *Goodness of Fit for Confirmatory Factor Analysis*

Index	Criterion	Source	Practical values
CMIN/DF	1＜CMIN＜3，well-fitting；	Hair et al. (2010)	514.308/349 or 1.474
GFI	＞0.8	Hair et al. (2006)	0.942

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Index	Criterion	Source	Practical values
AGFI	＞0.8	Sica & Ghisi (2007)	0.928
CFI	＞0.9	Hair et al. (2006)	0.979
TLI	＞0.9	Hair et al. (2006)	0.976
NFI	＞0.9	Bentler, (1990)	0.939
RMSEA	＜0.08 Reasonable fit	Pedroso et al. (2016)	0.029

Table 5 Confirmatory Factor Analysis Result, Composite Reliability (CR), and Average Variance Extracted (AVE)

Variable	Subject	Factors Loading> 0.5	T-value >1.98 & p-value<0.05	CR >0.7	AVE >0.5
Instructor Characteristics (IC)	IC1	0.757		**0.852**	**0.591**
	IC2	0.786	18.128***		
	IC3	0.680	15.624***		
	IC4	0.842	19.187***		
Virtual Classroom Quality (VCQ)	VCQ1	0.793		**0.841**	**0.570**
	VCQ2	0.707	16.503***		
	VCQ3	0.753	17.615***		
	VCQ4	0.763	17.83***		
Student Expectation (EXP)	EXP1	0.762		**0.819**	**0.531**
	EXP2	0.685	15.391***		
	EXP3	0.695	15.604***		
	EXP4	0.770	17.190***		
Course Design Quality (CDQ)	CDQ1	0.758		**0.828**	**0.546**
	CDQ2	0.755	16.463***		
	CDQ3	0.709	15.576***		
	CDQ4	0.732	16.043***		
Course Content Quality (CCQ)	CCQ1	0.775		**0.815**	**0.595**
	CCQ2	0.790	17.397***		
	CCQ3	0.748	16.695***		
Perceived Usefulness (PU)	PU1	0.838		**0.872**	**0.695**
	PU2	0.845	22.526***		
	PU3	0.817	21.758***		
Satisfaction (S)	S1	0.772		**0.842**	**0.641**
	S2	0.826	19.158***		
	S3	0.802	18.713***		
Intentions to Use (IU)	IU1	0.799		**0.876**	**0.638**
	IU2	0.789	19.971***		
	IU3	0.835	21.318***		
	IU4	0.770	19.401***		

Note: ***=P<0.001, **=P<0.01, *=P<0.05

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Table 6 Discriminant Validity

Correlation	IC	VCQ	EXP	CDQ	CCQ	PU	S	IU
IC	**0.769**							
VCQ	0.392	**0.755**						
EXP	0.424	0.389	**0.729**					
CDQ	0.261	0.235	0.339	**0.739**				
CCQ	0.375	0.412	0.557	0.323	**0.771**			
PU	0.384	0.432	0.533	0.407	0.522	**0.833**		
S	0.452	0.382	0.592	0.314	0.601	0.539	**0.800**	
IU	0.409	0.415	0.562	0.450	0.468	0.494	0.566	**0.799**

Structural Equation Modeling (SEM)

Structural Equation Modeling (SEM), which also became Structural Equation Analysis (SEM), is a statistical method for analyzing the relationship between variables based on their covariance matrices, so it also became Structural Analysis of Covariance (SACOC).SEM is a multivariate multiple regression and factor analysis method that organically combines multiple regressions and factor analysis methods to automatically assess a series of interrelated cause-and-effect relationships. statistical analysis techniques. Structural equation modeling serves a similar purpose as multiple regression but has more powerful capabilities for modeling under complex conditions such as hidden variables, dependent variable correlation, presence of variable error, and multiple dependent variables. Structural equations are a statistical analysis tool based on sample data to assess the acceptability of a theoretical model proposed by a researcher.

Table 7 Goodness of Fit for Structural Equation Modeling

Index	Criterion	Source	Practical values
CMIN/df	1＜CMIN＜3	Hair et al. (2010)	**720.440/360 or 2.001**
AGFI	＞0.8	Hair et al. (2006)	**0.904**
GFI	＞0.8	Sica & Ghisi (2007)	**0.920**
TLI	＞0.9	Hair et al. (2006)	**0.949**
NFI	＞0.9	Hair et al. (2006)	**0.914**
CFI	＞0.9	Bentler, (1990)	**0.955**
RMSEA	< 0.08	Pedroso et al. (2016)	**0.042**

Hypothesis Testing Results

The results in Table 8 show that each hypothesis was tested using standardized path coefficients (β) and t-values to assess the strength and significance of the interconnections between the items (Ioannidou & Erduran, 2022). The analysis showed that the p-value was less than 0.05, which means that the hypotheses were statistically significant, i.e. they were all valid. The results showed that six of these hypotheses were supported, which means that six of the independent variables had a significant effect on the dependent variable.

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Table 8 *Hypothesis Result of the Structural Equation Modeling*

Hypothesis			Standardized Coefficients (β)	t-value	Result
H1a : IC	→	PU	0.277	5.609***	Supported
H2a : VCQ	→	PU	0.354	6.987***	Supported
H3a : EXP	→	S	0.333	5.995***	Supported
H4a:CDQ	→	S	0.063	1.452	Not Supported
H5a : CCQ	→	S	0.323	5.880***	Supported
H6a : PU	→	S	0.252	6.013***	Supported
H7a : S	→	IU	0.612	12.011***	Supported

Note: *** (P<0.001) ** (P<0.01) * (P<0.05)

The standardized path coefficient from Instructor Characteristics to Perceived Usefulness is 0.277 (t-value=5.609, p=0.000<0.01), which indicates that Instructor Characteristics have a significant positive effect on Perceived Usefulness, i.e., the higher the Instructor Characteristics, the higher the Perceived Usefulness, so the hypothesis is valid.

The standardized path coefficient of classroom quality to perceived usefulness is 0.354 (t-value=6.987, p=0.000<0.01), which indicates that classroom quality has a significant positive effect on perceived usefulness, i.e., the higher the quality of the classroom, the higher the perceived usefulness, and therefore the hypothesis is valid.

The standardized path coefficient of Student Expectation to Satisfaction is 0.333 (t-value=5.995, p=0.000<0.01), which indicates that Student Expectation has a significant positive effect on Satisfaction, i.e., the higher the Student Expectation, the higher the Satisfaction, so the hypothesis is valid.

The standardized path coefficient of Course Design Quality to Satisfaction is 0.063 (t-value = 1.452, p>0.05), which indicates that there is no significant positive effect of Course Design Quality on Satisfaction, so the hypothesis is not valid.

The standardized path coefficient of Course Content Quality to Satisfaction is 0.323 (t-value=5.880, p=0.000<0.01), which indicates that there is a significant positive effect of Course Content Quality on Satisfaction, i.e., the higher the Course Content Quality, the higher the Satisfaction, so the hypothesis is valid.

The standardized path coefficient of perceived usefulness to satisfaction is 0.252 (t-value=6.013, p=0.000<0.01), which indicates that perceived usefulness has a significant positive effect on satisfaction, i.e., the higher the perceived usefulness, the higher the satisfaction, so the hypothesis is valid.

The standardized path coefficient from satisfaction to intention to use is 0.612 (t-value=12.011, p=0.000<0.01), which indicates that satisfaction has a significant positive effect on the intention to use, i.e., the higher the satisfaction, the higher the intention to use, so the hypothesis is valid.

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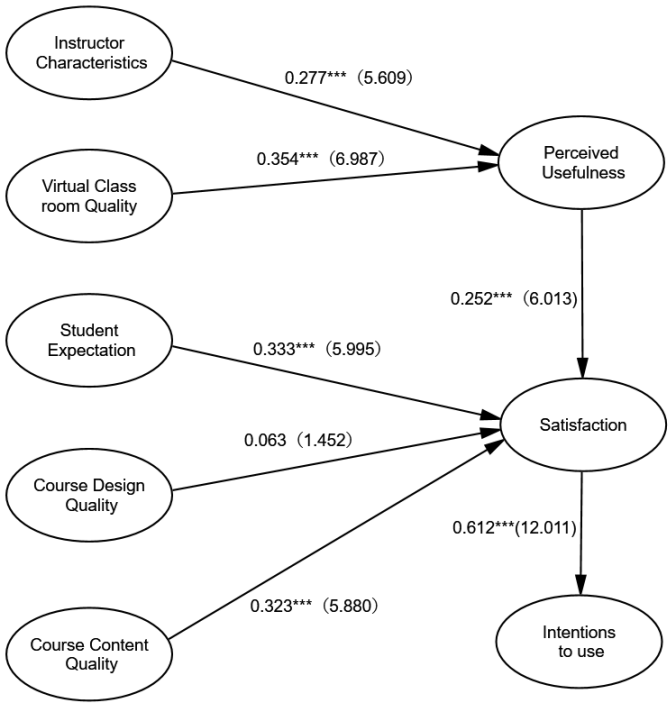

Figure 2 *Path Diagram Analysis*

Note: *** (P<0.001) ** (P<0.01) * (P<0.05) , The t-values are in parentheses

Mediation effect test

The Bootstrap method can be used to directly test the existence of mediating effects. The hypothesis condition for the direct test is H_0: ab = 0. If the test results yield a confidence interval containing 0, it means that there is no mediating effect. The two factors that have a direct effect on perceived usefulness are Instructor Characteristics (0.277) and Classroom Quality (0.353). The independent variables explained 27.9% of the variation in perceived usefulness. The four factors that had a direct effect on satisfaction were Student Expectation (0.333), Course Design Quality (0.063), Course Content Quality (0.323), and Perceived Usefulness (0.252). The independent variables with indirect effects came from Instructor Characteristics (0.070) and Classroom Quality (0.089). The independent variables explained 7% of the variation in satisfaction. The direct influence on behavioral intention to use MOOC hybrid education satisfaction (0.612). The independent variables with indirect effects are Student Expectation (0.204), Course Design Quality (0.039), Course Content Quality (0.198) and Perceived Usefulness (0.155). The independent variables explained 37.5% of the change in behavioral intention to use MOOC hybrid education.

Table 9 *Mediation effects tests (direct, indirect, total effects)*

Independent Variables	Dependent Variables											
	Perceived Usefulness (PU)				Satisfaction (S)				Intentions to use (IU)			
	DE	IE	TE	R^2	DE	IE	TE	R^2	DE	IE	TE	R^2
IC	0.277	-	0.277		-	0.070	0.070		-	-	-	

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Independent Variables	Dependent Variables											
	Perceived Usefulness (PU)				Satisfaction (S)				Intentions to use (IU)			
	DE	IE	TE	R^2	DE	IE	TE	R^2	DE	IE	TE	R^2
VCQ	0.354	-	0.354		-	0.089	0.089		-	-	-	
EXP	-	-	-		0.333	-	0.333		-	0.204	0.204	
CDQ	-	-	-	0.279	0.063	-	0.063	0.525	-	0.039	0.039	0.375
CCQ	-	-	-		0.323	-	0.323		-	0.198	0.198	
PU	-	-	-		0.252	-	0.252		-	0.155	0.155	
S					-	-	-		0.612	-	0.612	

Conclusions

The purpose of this study was to investigate what factors influence undergraduate visual communication students' intention to implement hybrid education using MOOC at the Chengdu Vocational University of Art. Seven hypotheses were proposed based on a conceptual framework that addressed the direct or indirect effects of instructor characteristics, virtual classroom quality, student expectations, course design quality, course content quality, perceived usefulness, and satisfaction with intention to use. To test this, 571 freshman to senior students with at least one month of hybrid education experience were selected to participate in the questionnaire. Validated factor analysis (CFA) was used to confirm that the data conformed to the framework established by the study, and structural equation modeling (SEM) was used to assess the relationship between intention to use and latent variables. The results of the study showed that instructor characteristics and virtual classroom quality had a positive effect on the perceived usefulness of the course, while perceived usefulness, student expectations, and course content quality had a significant positive effect on satisfaction.

However, course design quality had no significant effect on satisfaction. This ultimately indicates that satisfaction has a significant positive effect on the intention to use. It indicates that satisfaction in using technology directly affects students' intention to use it. It is worth noting that there is an indirect effect on behavioral intention to use MOOC hybrid education in addition to the direct effect, with student expectation being the most significant. It indicates that students' attitudes, beliefs, or expectations about MOOC hybrid education have a more important influence on their behavioral intention. In this case, teachers need to focus on and promote students' expectations to enhance their positive attitudes towards MOOC hybrid education and thus increase their intention to use it.

Recommendations

Based on the objectives and findings of the study, the following are some practical recommendations that can help schools and educators improve the implementation and promotion of hybrid education to meet the needs of students and increase their intention to use hybrid education:

Improving Instructor Characteristics. The role of teachers in hybrid education is critical. Schools can improve the quality of their teaching and interaction with students by providing professional training and support to ensure that teachers have the necessary skills and knowledge. This will help to enhance the perceived usefulness of the education system to students.

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Improving Virtual Classroom Quality. To increase student satisfaction and perceived usefulness, schools can invest in virtual classroom technology and infrastructure improvements. Ensure the stability, ease of use, and interactivity of the virtual classroom to increase students' positive experience with online learning.

Please pay close attention to Student Expectations. It is critical to understand Student Expectations and needs for blended education. Schools can conduct regular surveys and feedback to accommodate Student Expectations and make improvements based on their feedback.

Improve Course Content Quality and optimize course content to ensure that it is engaging, practical, and educational to increase student satisfaction and perceived usefulness. The use of multimedia, interactive, and personalized learning materials can enhance students' interest in the course and learning outcomes.

Focusing on student satisfaction, schools should actively monitor student satisfaction to understand their feedback and needs. Provide support and services to meet Student Expectations and enhance their satisfaction and loyalty.

Promote perceived usefulness, to enhance students' perceived usefulness of the educational system, educators can emphasize the practical applicability and potential benefits of online learning. Provide students with concrete examples and experiences to help them realize the importance of online learning for their academic and professional development.

Continuous Improvement of Course Design Although this study did not find a significant effect of Course Design Quality on satisfaction, there is still a need for continuous attention and improvement of course design to ensure that it meets Student Expectations and needs.

Considering different types of schools, although the scope of the study was limited to the Chengdu Vocational University of Art, other vocational colleges and universities can learn from these results and adapt hybrid education to their specific environments and student body needs.

Overall, these recommendations can help educational institutions better meet the needs of their students and improve their intentions to use hybrid education, thereby promoting a more effective online learning experience.

Limitations and further exploration

First of all, this study has some limitations. The scope of the study was limited to Chengdu Vocational University of Art and, therefore, could not represent other types of universities. Some relevant universities were not included in the study, which may place some constraints on the universality of the findings.

Second, the sample capacity was limited, including only 571 undergraduate students majoring in visual communication at the Chengdu Vocational University of Art. Due to the limitation of sampling, the results of the study only reflect the characteristics of a specific sample and fail to fully consider the diversity of students in vocational universities.

Third, there are some limitations on students' learning time in hybrid education. Face-to-face teaching time is usually fixed, while online learning time is relatively time for investigation in this study fails to cover students' learning experiences comprehensively.

Fourth, the conceptual framework in the study included eight potential variables that directly or indirectly influence intention to use, but some other confounding variables that may have significant effects were not included in the analysis. This may result in the study not taking into account some

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potential factors, and there may be some omissions for a deeper understanding of students' intentions towards MOOC hybrid education.

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