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Art Design Major Undergraduate's Satisfaction towards Online Education: A Case of Public Universities in Sichuan, China

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Abstract

The paper aims to evaluate the essential determinants that have a significant effect on satisfaction for online education of art design major undergraduate students from four public universities in the Sichuan Province of China. Perceived Ease of Use (PEOU), Perceived Usefulness (PU), Attitude (ATT), Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI) and Satisfaction (SAT) were all investigated to determine if these constructs influence satisfaction of students with online education. The researcher applied a quantitative exploration approach with 487 samples and distributed the quantitative questionnaire to art design major undergraduates at four target universities. The multistage sampling approach was utilized in this survey. Confirmatory Factor Analysis (CFA) and Structural Equation Model (SEM) were utilized to determine the relationships of the variables under study. The entire hypotheses were supported by the results of the data analysis, in which social influence indicated the most powerful direct effect on satisfaction. For students to acknowledge and recognize the effectiveness of online education, university administrators and teaching staffs should pay sufficient attention to the factors which has generated significant influence on the satisfaction of the instruction, and consider the correlated teaching adjust or reform in the future according to the findings of this research.

Introduction

Online interactive cognition has been characterized as online learning (Mulyanengsih & Wibowo, 2019). Because of the accelerated development of the periods, university and college instructional methodologies have undertaken considerable alterations. The traditional instructional strategy is no longer appropriate for achieving the requirements of colleges and universities in the face-to-face teaching environment. Instead, advanced instructional concepts, pedagogical approaches, and educational methodologies have been developed (Yang, 2021). Online learning becomes the vital educational technique in China right now, especially considering the COVID-19 pandemic.

Chinese online education has expanded fast in recent years. In 2020, according to the investigation of iResearch Statistical Institution: the funding of online education in China has reached approximately 25.73 billion RMB, with 14.12 million subscribing learners (iResearch, 2021). In anticipation of the COVID-19 pandemic in 2020, numerous traditional educational establishments instantly adjusted their instructional methodology. About 52% of academic institutions of higher education converted to unrestricted online instruction (Huachuang Securities, 2021). Nonetheless, several concerns call the attention of researchers to a certain extent. A considerable percentage of institutions converted the traditional instructional classrooms into the digital education platform without making specific adjustments to accommodate the requirements of the online learning environment (Xiang, 2019). Furthermore, it is undeniable that the assessment of online education the essential section (Zhang & Wang, 2014; Li & Deng, 2020). Additionally, the administration offered insufficient online education, despite the fact that colleges and institutions in Southwest China strongly emphasized undergraduate art design qualifications (Dai, 2017). A number of academic achievements in China currently geared toward online learning is extremely limited, and the overwhelming scientific publications are qualitative research, with only a small portion being quantitative investigation.

One of the principal elements for evaluating the efficiency of education and technology advancements is satisfaction of its users (Annamdevula & Bellamkonda, 2016; Wu & Wu, 2019). The connection between what learners expect from an educational strategy or quantity of education and how they adapt when utilizing it is known as satisfaction (Nagy, 2018). According to the preceding investigations, the latent variables from the technology acceptance theories were the fundamental determinants influencing their satisfaction towards their online education. The appropriate usage of the pedagogical technique of the online learning could facilitate more learning achievements for target students (Ajmal et al., 2021). As a result, it is crucial to strengthen student instructional satisfaction while under the circumstance massive epidemic era of the COVID-19 in Chinese higher education system. The association between instructional effectiveness and performance and students' learning satisfaction has increased substantially (Lan & Luo, 2022).

Based on previous investigation, this research explores the components that considerably influence online instruction for undergraduates specializing in art design in China. The analysis concentrated on the satisfaction of students on online learning in China. Considering the connected factors, it is evident that a quantifiable investigation is required to

examine how university students specializing in art design in Sichuan province, China, evaluate their degree of satisfaction with six key characteristics connected to online learning.

Literature Review

Online Education of China

The beginning of Chinese online education was in 1990, Ministry of Education of China has approved sixty-eight universities as the pilot point for online education. After over thirty years development, Chinese online education has obtained the nonnegligible achievements. Not only the mark size which has been mentioned in the previous section of this research, but also the percentage of the universities level participant for the online education. According to the statistical report from iResearch Statistical Institution in 2019, the proportion of university level students for Chinese online education was 49.6%.

However, there are still several weak points for Chinese online education, and the majority one is the insufficient amount of the academic research achievements. According to the retrieved results in Chinese National Knowledge Infrastructure (CNKI), the most powerful and official academic website of China, until Sep 2022, there were almost 559,400 academic literatures in higher education, which including the journal articles and dissertations, while only 20,092 achievements were focus on online education, and the majority amount of them were qualitative research, only few of them were quantitative research, and the research applied the statistical analysis approach with the Confirmatory Factor Analysis and Structural Equation Model were even limited.

Art Online Education of China

Since 1995, the policy of Chinese government has given opportunity and possibility to the development of art education. With the 30 years construction, Chinese higher art education has achieved a high level of development: multiple essential art colleges have been established, and a massive number of academic universities have established a variety of art major, such as design, music, drama, dance, arts and crafts subjects.

Art online education is a category of electronic instruction in China, and the advantages of online art learning essentially including three factors: the education approaches are efficient and accessible; individualized courses that are more appropriate to instructing. According to the characteristics of the art design major, Online art education can provide sufficient online teaching resources to facilitate students to provide effective learning and sufficient technical assistance in electronic image creation, graphic design, animation design, three-dimensional character production and other aspects.

Recent year, the amount of Chinese online art education industry has expanded to 3.1 billion yuan in 2020, with a compounded annualized development rate of 45.07 percent from 2016 to 2020 (ASKCI, 2022).

Technology Acceptance Model (TAM)

Technology Acceptance Model (TAM) was initially created to express informative technology acknowledgment from the corporate viewpoint (Davis, 1985; Davis et al., 1989). The assumption is founded on the supposition that exclusively specific viewpoints on

application, particularly the perceived value and usability of the invention itself, would have a consequence on technical acceptability. During the TAM's original development, it was universally acknowledged and noticed that for the accurate prediction of the technology acceptance expectations and behavioral intention in the quantitative academic research. (Yousafzai et al., 2007).

The TAM concept was frequently used in academic and pedagogical investigations to predict participants' attitudes or behavioral intentions toward a certain educational technique. Because the perceived ease of use, perceived usefulness is regarding to the evaluate the difficulty and effectiveness of the target education system, and attitude is the essential exogenous variable to endogens variable satisfaction. Consequently, the conceptual framework employed perceived ease of use and perceived usefulness as the independent variable, and attitude as the mediator variable.

Unified Theory of Acceptance and Use Technology (UTAUT)

The Unified Theory of Acceptance and Use of Technology (UTAUT) is an interdisciplinary framework that was drawn from eight previous behavioral frameworks, including different designs of technological adoption models that analyze the acceptability of informational technologies. The UTAUT is intended to consider various situations, including using technology for social and recreational purposes (Venkatesh, et al., 2003). The UTAUT is employed in this study because it incorporates all the preexisting ideas of determining the psychological reaction for the usage of the target technology system. It incorporates social influence and enabling factors from the Theory of Planning Behavioral (TPB), as well as performance expectancy and effort expectancy that were examined using the TAM theory. The paradigm demonstrates how these traits are associated with behavioral intention and how behavioral intention and observable behaviors are interconnected (Ajzen, 1991; Davis, 1985). UTAUT was later validated by Venkatesh, et al. (2003) in a continuous investigation, and they established that it accounted for 70% of the variability in behavioral intention.

Nearly identical to the TAM, the UTAUT framework was invariably used in the educational scholastic investigation domain to predict students' attitudes or behavioral intentions toward a certain instructional method. For the preciseness of this research, social influence, effort expectancy, and performance expectancy are suitable for this quantitative research. Therefore, the conceptual framework has selected all these three latent variables as the independent variable.

Perceived Ease of Use

Perceived ease of use has been employed to establish whether the participant believes the specified strategy could be carried out with little effort or because it would not require using one's physical or psychological faculties (Davis,1989). Anyone who independently uses a given technique without needing to exert effort or struggle to achieve the goals is said to be using it with seeming ease (Neo et al., 2015). One example is the study conducted by Nagy (2018) which convinced that the student who perceived to utilize the online video learning could reduce the difficulty of the learning task. This could outline the fundamental presumptions that underlie openness to innovation in a certain system category and that, in turn, influence people's

behavioral inclinations and, eventually, determine their usage dispositions (Gangwar et al., 2015).

According to Davis (1989) and Teo (2009), perceived ease of use has a significantly instantaneous impact on perceived usefulness and, infrequently, the other direction. According to a quantitative study by Venkatesh and Davis (2000), perceived ease of use significantly affects perceived usefulness. Following the research findings of a series of pervious academic explorations, multiple researchers convinced that there is a certain significant association from the exogenous variable perceived ease of use to endogenous variable perceived usefulness (Chen, 2008; Kim et al., 2007; Heijden et al., 2003; Wang et al., 2003; Nagy, 2018). Multiple categories of educational research have demonstrated that attitudes toward the perceived usefulness of a certain methodology have a significant and positive impact on perceived ease of use (Taylor & Todd, 1995; Karahanna et al., 1999).

Perceived Usefulness

Individuals anticipate that employing a specified strategy would increase their professional effectiveness, defined as perceived usefulness (Davis, 1989). Perceived usefulness is the prerequisite for long-term instructional objectives (Lwoga & Komba, 2015). According to Cigdem and Ozturk (2016), perceived usefulness corresponds to a participant's perception that utilizing a particular mechanism would enable him or her to accomplish a project. It is when someone decides that a combination of instructional approaches might enhance their learning capacity (Fokides, 2017). Bhattacherjee (2001), on the other hand, admitted that perceived usefulness has a great influence on technical intentionality. The perceived usefulness influences whether or not someone would continue to utilize innovation (Liaw, 2008).

Perceived usefulness implies attitudes, according to Agarwal and Prasad (1999). Generally, the sentiments were considerably impacted by the perceived usefulness of the assessment for the learning effect (Nagy, 2018). Perceived usefulness enormously impacted participation evaluations on satisfaction than perceived ease of use, according to multiple studies (Shih & Fang, 2004). Likewise, countless researches have examined how perceptions and attitudes were impacted by perceived usefulness (Celik, 2013; Cheng et al., 2006; Chiou & Shen, 2012; Lee, 2009).

Performance Expectancy

The degree to which a respondent acknowledges that using the technology would advantage him or her in improving work efficiency is characterized as performance expectancy (Venkatesh et al., 2003; Hoi, 2020). Performance expectancy refers to a participant's assumption that the specific approach or technology would enhance their professional performance (Wu & Wu, 2019; Alshare & Lane, 2011). According to Mtebe and Raisamo (2014), performance expectancy concerns students' perception of the success of the educational design. The extent to which a pupil is persuaded that embracing technology would help him or her accomplish work performance advancements is referred to as performance expectancy (Adedoja et al., 2013). This illustrates individuals' conviction that utilizing interactive technologies would support them to strengthen their educational performance expectancy (Ngampornchai & Adams, 2016; Mahande & Malago, 2019; Bardakc, 2019).

As a response, in methodologies for electrical or informatization consumption, performance expectancy could be incorporated as a determinant of attitude (Zboja et al., 2020; Anderson & Kida, 1985; Venkatesh & Davis, 2000). Furthermore, performance expectancy is a fundamental element of a collaborative computational educational atmosphere that originated from individuals' assumptions of competence to put their attitudes into activity (Kasim, 2015).

Effort Expectancy

effort expectation, including factors such as the convenience of usage and sophistication of the technology (Venkatesh, et al.2003). The participant's effort expectancy defines how straightforward it is for the equipment to be used (Ssekakubo, et al., 2011; Alshare & Lane, 2011; Wu & Wu, 2019). Individuals' performance assumptions for technological acquiescence would increase as a reflection of their effort expectancy (Ghalandari, 2012). Effort expectancy is a measurement of whether an individual considers that using technology will be enjoyable (Ssekakubo, et al., 2011). Current findings have established that effort expectancy determines participants' perseverance in technology use (Chao, 2019; Ngampornchai & Adams, 2016; Alshare & Lane, 2011; Wu & Wu, 2019; Hoi, 2020).

Effort expectancy may demonstrate the attitude toward using a specialized technology based on preceding pedagogical achievements (Anderson & Kida, 1985). According to Alshare and Lane (2010), if participants identify complexities and awareness in advancements for effort expectancy, individuals would have a negative opinion about it and refuse it. Percy and Belle (2012) revealed effort expectancy influences individuals' attitudes toward technology and, its attractiveness, and use of online education resources.

Attitude

Attitude is an essential mediator variable of the theory of the Technology Acceptance model, which is the essential influencer to the satisfaction (Alshare & Lane, 2011). Attitude is characterized as a person's long-term psychological incentive for a particular commodity or informational technology, and it is an individual's fundamental psychological predilection toward a specific property product or information system (Ajzen, 1991). Attitude is a significant predictor of behavioral intention (Golnaz et al., 2010; Nagy, 2018; Hoi, 2020). An attitude was a subjective experience of something, such as appreciating or disapproving it. In other circumstances, under the theory of theory of planned behavior, attitude is an essential indicator to explained the individuals' psychological reaction towards the certain technical system (Armitage & Conner, 2001). It identified whether or not the respondent approved of the engagement and described a participant's inclinations for an activity or an objective informational or intelligence system (Al-Debei et al., 2013). The attitude judgment assessment encompassed accessibility, applicability, dependability, and appearance during the information comparability evaluation (Ozgen & Kurt, 2013). Several studies have demonstrated a significant association between attitude and acquiring intention (Amos et al., 2008; Hoi, 2020).

Kim et al. (2015) suggest that attitude substantially impacts on how something is viewed. According to psychologists, one of the greatest crucial elements in establishing satisfaction is individual attitude (Golnaz et al., 2010). Initially, Fishbein and Ajzen (1975) researched attitude in the concept of reasoned action; afterward, Davis (1989) introduced

attitude as a fundamental term in the technology acceptance model, proposing that attitude impacted the participant's cognitive predilection and satisfaction.

Social Influence

Social influence was the orientation and effectiveness of a participant's perspectives, sympathies, sentiments, or behaviors. It can influence people's behavioral intentions and satisfaction. Personalities affected by other individuals' actions (Fishbein & Ajzen, 1975). As characterized by White Baker (2007), social influence is a tremendously prevalent and cognitively oriented phenomenon that describes how a person's attitude and psychological condition change in the trajectory of sociological predominance as a consequence of social pressure. According to Nuttavuthisit and Thgersen (2017), social influence's specification establishes conformance, sociocultural accelerating, social unresponsiveness, community fragmentation, and community contemplation. Social influence caused people to alter their behavior to match others'. Whenever individuals aspire for approval and interaction from outsiders, individuals alter their perspectives and behaviors to maintain current with contemporary and acknowledged experts (Kanchanapibul et al., 2014).

According to the previous academic research has maintained a strong emphasis on social influence, which has significant impact on how satisfied individuals are with the use of a specific technological innovation in various contexts (Wu & Wu, 2019). In addition, Dowd and Pety (1982) demonstrated that social influence could be assessed by how well participants were expected to engage. According to Raza et al. (2020), social influence has the most significant interaction impact on satisfaction. Various pedagogical publications have acknowledged the advantages of social influence on satisfaction of executing the specific innovative technique (Lai & Pires, 2010).

Satisfaction

The participant's physiological evaluation of an arrangement correlates to the physiological phenomena known as satisfaction. It is the satisfaction experienced whenever the individual's expectations are satisfied. It is the connection that develops between respondents' anticipation of a commodity and their experience with it in rationality after employing it (Nagy, 2018). User satisfaction is an individual's overall evaluation of the encounters connected to the services and activities (Wu et al., 2010). Academic research has characterized satisfaction as a condition resulting of the study effect or outcome from the evaluation made immediately after an acquisition or a psychological response (Oliver, 1993; Alshare & Lane, 2011). One of the key criteria for assessing the efficacy of technical advancements is satisfaction (Annamdevula & Bellamkonda, 2016). Chris and Hsieh (2006) characterize satisfaction as the quantity to which participants considered the technology effective and wanted to continue using it. A frequently used metric for assessing a framework's functionality is satisfaction. It generally focuses on how individuals perceive technology administration and how knowledgeable they are with it (Cigdem & Ozturk, 2016; Wu & Wu, 2019).

Conceptual Framework

In order to construct the conceptual framework, existing scientific research approaches were examined. Additionally, it was based on the TAM and UTAUT from four theoretical frameworks. Nagy (2018) identified a correlation between attitude, perceived usefulness, and perceived ease of use. Besides, Hoi (2020) demonstrated how interconnected performance expectancy, effort expectancy, and attitude are. In addition, Alshare and Lane (2011) also established that attitude and satisfaction are associated. Last but not the least, Wu and Wu (2019) demonstrated how related satisfaction and social influence are. The conceptual framework was constructed based on these constructs as shown in Figure 1.

Figure 1:

Conceptual Framework
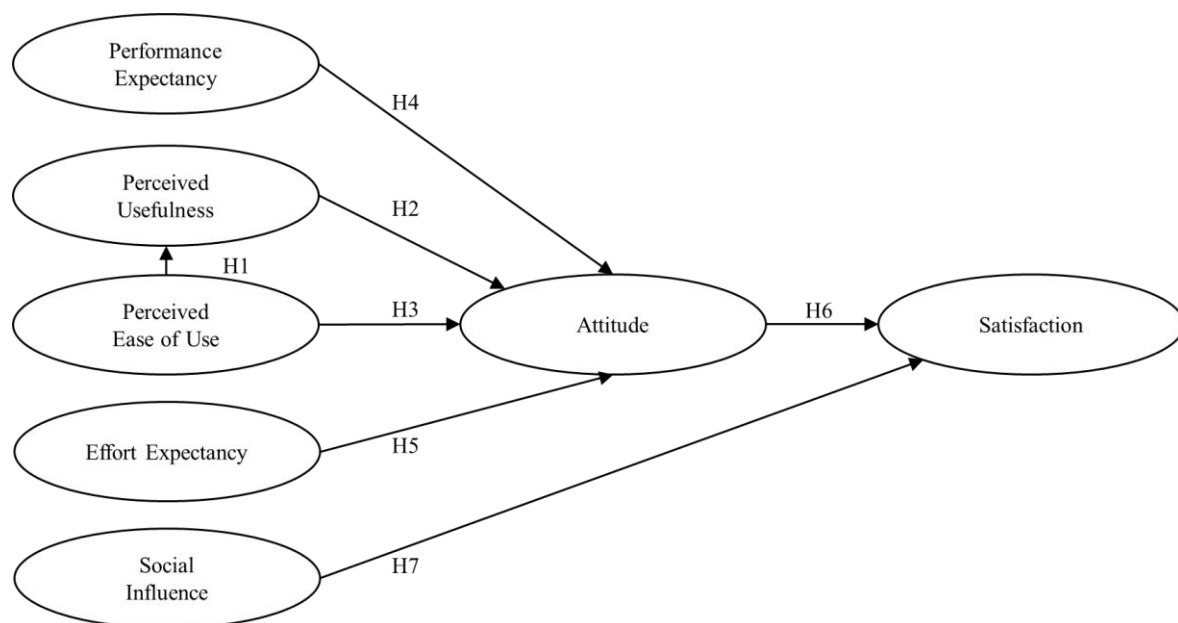
Note: Constructed by the Author

Taking into account seven latent variables, including perceived ease of use, perceived usefulness, performance expectancy, effort expectancy, social influence, and attitude, this survey determined to investigate crucial elements that influence satisfaction of undergraduate art design students on online education from four public universities in Sichuan Province, China. Furthermore, this research also investigated the causal relationship between each latent variable to determine the factors that impact satisfaction.

According to the structure of the conceptual framework, the following hypotheses were formulated:

H1: Perceived ease of use has a significant impact on perceived usefulness.
H2: Perceived usefulness has a significant impact on attitude

H3: Perceived ease of use has a significant impact on attitude.

H4: Performance expectancy has a significant impact on attitude.

H5: Effort expectancy has a significant impact on attitude.

H6: Attitude has a significant impact on satisfaction.

H7: Social influence has a significant impact on satisfaction

Research Methodology

This research is to determine the art design major undergraduates' satisfaction to online education who from Chengdu University (CDU), Sichuan Conservatory of Music (SCM), Xihua University (XHU), and Southwest Minzu University (SMU) in Sichuan of China. This research has conducted the quantitative survey approach, which was the most effective research methodology for collecting students' attitude data and determine their psychological responses.

Research Instrument

The instrument of this research is the quantitative questionnaire, which could be divided into three sections: screening question, demographic information, and the scale items for the entire observed variables. First and foremost, standardized screening question was initially designed to distinguish and examine persons with particular characteristics (Cooper & Schindler, 2011; Kervin, 1992), so the researcher according to the 1 item of the screening question to ensure the samples were suitable for the subsequential interview. Furthermore, the demographic surveys were utilized to collect background characteristics of the respondents, including gender, major, and pertinent university information (Mertens, 2015; Lodico et al., 2006). And the researcher conducted 3 items to determine the students' demographic information such as the gender, universities data, and the academic years. In additional, 31 scale items which adopted from the previous literature were utilized to evaluate the latent variables, which including 5 items for perceived ease of use, 5 items regarded to perceived usefulness, 4 items connected to attitude, 4 items associated to performance expectancy, 4 items correlated to effort expectancy, 4 items regarded to social influence, and last 5 items connected with satisfaction. The five-point Likert scale was implemented for estimation of the entire scale items, with 5 indicating strong approval for the optimistic items and 1enoting strong disapproval for the negative items (Salkind, 2017). The detail information of the scale item was summarized in Appendix A.

Validation of the Research Instrument

For the validity of the scale items, four experts with Ph.D. educational background, who holding at least the associate professor, and at least nine years experiences in online education academic researchers were invited to conduct the item-objective congruence (IOC) assessment to examine the precise objectives recommended by the instrument developer for this investigation. The lowest score of the IOC assessment was 0.75 which indicate the entire scale items were regarding the satisfactory content validity.

In addition, the pilot test was conducted to evaluate the internal consistency reliability of the research instrument. determined. According to several investigators (Hassan et al., 2006; Lavrakas, 2008), a respondent group of 10 to 30 members was acceptable for the pilot

examination. Consequently, 40 students performed the pilot test, and the internal consistency reliability was evaluated by using the Cronbach's Alpha index. According to the results of the pilot test, the lowest Cronbach's Alpha of the constructs was 0.885, which indicated internal reliability of the scale items was at the ideal condition. The entire information was demonstrated in Table 1.

Table 1

Results of Internal Consistency Reliability Evaluation of the Pilot Test

Constructs	No. of Items	Cronbach's Alpha
Perceived Ease of Use	5	0.945
Perceived Usefulness	5	0.889
Attitude	4	0.885
Performance Expectancy	4	0.946
Effort Expectancy	4	0.894
Social Influence	4	0.965
Satisfaction	5	0.957

Note: Constructed by the Author

Data Collection and Analysis

Following the content validity and internal consistency reliability assessment preceding the full-scale data collection, the in-person questionnaire forms were forwarded to 500 undergraduates in art design major who from four target universities. The researchers utilized the statistical programs JAMOVI and AMOS to investigate the information. The researchers also conducted confirmatory factor analysis (CFA) in order to evaluate the factor loading, t-value, composite reliability (CR), average variance extracted (AVE), and discriminant validity, The structural equation model (SEM) was subsequently employed to investigate the outcomes of the hypotheses as well as the direct, indirect, and overall effects of the correlations between the latent variables.

Population and Sample Size

The entire art design undergraduates majoring in art design from four noteworthy public universities in Sichuan Province of China were the survey's target population. These colleges are Chengdu University (CDU), Sichuan Conservatory of Music (SCM), Xihua University (XHU), and Southwest Minzu University (SMU). Hair, et al. (2010) recommended that 200–500 respondents be the minimum sample size for the challenging methodological approach in the structural equation model. Therefore, after screening and quota selection, 500 students were chosen as the final sample size from a population of 1600.

Sampling Strategy

The sample was chosen from 1453 undergraduates from the target four crucial public universities in Sichuan Province of China with two-month online education at the initial stage. Afterwards, 500 respondents were selected from the 12 divisions utilizing quota selection as

the final stage sample. After collecting the questionnaires, 487 were considered valid and 13 invalid data.

Table 2

Sample Units and Sample Size

Target Public Universities	Grade	Judgmental Size Total=1453	Proportional Sample Size Total = 500
Chengdu University	Freshman	95	33 (95*500/1453)
	Sophomore	98	34 (98*500/1453)
	Junior	112	39 (112*500/1453)
	Senior	106	35 (106*500/1453)
Sichuan Conservatory of Music	Freshman	121	42 (121*500/1453)
	Sophomore	109	38 (109*500/1453)
	Junior	115	40 (115*500/1453)
	Senior	102	35 (102*500/1453)
Xihua University	Freshman	79	27 (79*500/1453)
	Sophomore	82	28 (82*500/1453)
	Junior	79	26 (79*500/1453)
	Senior	86	30 (86*500/1453)
Southwest Minzu University	Freshman	66	23(66*500/1453)
	Sophomore	69	24 (69*500/1453)
	Junior	70	24 (70*500/1453)
	Senior	64	22 (64*500/1453)

Note: Constructed by the Author

Results and Discussion

Demographic Information

The comprehensive demographic characteristic information of 487 respondents is summarized in Table 3. Male students constituted 40.66% of all participants, while female respondents comprised 59.34% with 28.75% of students enrolled in Chengdu University (CDU), 31.42% enrolled in Sichuan Conservatory of Music (SCM), 22.38% enrolled in Xihua University (XHU), and 17.45% enrolled in Southwest Minzu University (SMU). According to the participants' academic year, 24.85% were freshmen, 24.64% were sophomores, 26.07% were juniors, and 22.44% were seniors.

Table 3

Demographic Profile

Demographic Information (n=487)		Frequency	Percentage
Gender	Male	198	40.66%
	Female	289	59.34%
University Belong	CDU	140	28.75%
	SCM	153	31.42%
	XHU	109	22.38%
	SMU	85	17.45%
Academic Year	Freshman	121	24.85%
	Sophomore	120	24.64%

	Junior	127	26.07%
	Senior	119	22.44%

Note: Constructed by the Author

Confirmatory Factor Analysis (CFA)

Confirmatory factor analysis (CFA) was used to determine whether the scale items' constituent and loading counts matched expectations based on theories or presumptions. The outcome of the factor loading and acceptable values for each observed variable illustrated the goodness of fit of the research matrix (Hair et al., 2010). Additionally, as presented in Table 4, all of the applicable thresholds for the absolute fit indicators, such as CMIN/DF, GFI, AGFI, and RMSEA, as well as the incremental fit measurements as CFI, NFI, and TLI match the requirements. Consequently, all of these measurements for the goodness of fits employed in the CFA examination were acceptable.

Table 4

Goodness of Fit for Confirmatory Factor Analysis

Index	Criterion	Source	Practical Values
CMIN/DF	< 3.00	Hair et al. (2010)	1.958
GFI	> 0.85	Bagozzi & Yi (1988)	0.905
AGFI	> 0.80	Sica & Ghisi (2007)	0.886
RMSEA	< 0.08	Pedroso et al. (2016)	0.044
CFI	> 0.90	Bentler (1990)	0.955
NFI	> 0.90	Bentler & Bonnet (1980)	0.914
TLI	> 0.90	Bentler & Bonnet (1980)	0.950

Note: Constructed by the Author

Table 5

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

Latent Variables	Source of Questionnaire	Item	Factors Loading	S.E.	T-Value	P-Value	CR	AVE
Perceived Ease of Use	Vululleh (2018)	PEOU1	0.711	-	-	-	0.871	0.575
		PEOU2	0.760	0.063	16.239	***		
		PEOU3	0.759	0.060	16.227	***		
		PEOU4	0.745	0.063	15.910	***		
		PEOU5	0.755	0.038	27.468	***		
Perceived Usefulness	Vululleh (2018)	PU1	0.675	-	-	-	0.882	0.600
		PU2	0.809	0.075	15.481	***		
		PU3	0.755	0.077	14.627	***		
		PU4	0.787	0.074	15.146	***		
		PU5	0.837	0.076	15.886	***		
Performance Expectancy	Mtebe & Raisamo (2014)	PE1	0.773	-	-	-	0.885	0.660
		PE2	0.803	0.060	17.470	***		
		PE3	0.768	0.057	16.714	***		
		PE4	0.776	0.057	16.882	***		
Effort Expectancy	Mtebe & Raisamo (2014)	EE1	0.776	-	-	-	0.822	0.538
		EE2	0.681	0.064	14.033	***		
		EE3	0.688	0.063	14.162	***		

		EE4	0.782	0.063	15.810	***		
Attitude	Alshare & Lane (2011)	ATT1	0.747	-	-	-	0.885	0.660
		ATT2	0.736	0.066	16.218	***		
		ATT3	0.906	0.061	20.046	***		
		ATT4	0.848	0.061	18.896	***		
Social Influence	Mtebe & Raisamo (2014)	SI1	0.864	-	-	-	0.926	0.757
		SI2	0.892	0.043	26.543	***		
		SI3	0.891	0.042	26.512	***		
		SI4	0.833	0.042	23.505	***		
Satisfaction	Harsasi & Sutawijaya (2018)	SAT1	0.689	-	-	-	0.866	0.566
		SAT2	0.714	0.073	13.872	***		
		SAT3	0.715	0.050	20.444	***		
		SAT4	0.819	0.071	15.488	***		
		SAT5	0.814	0.071	15.422	***		

Note: *** p<0.001, ** p<0.01, * p<0.05
Note: Constructed by the Author

Table 5 demonstrates that the entire values of the average extracted variance (AVE) were greater than 0.50, the composite reliability (CR) was beyond 0.70, and the factor loading values were all over 0.50 (Hulland, 1999; Bagozzi & Yi, 1988).

The consequences of the investigation into and presentation of the discriminant validity are demonstrated in Table 6. The diagonally designated quantity is the AVE square root of the AVE, and neither of the correlations crossing any two latent variables was larger than 0.80 (Schmitt & Stults, 1986; Liu et al., 2020). Therefore, employing these quantitative measurements, the discriminant validity was established.

Table 6

Discriminant Validity

	PEOU	PU	ATT	PE	EE	SI	SAT
PEOU	0.758						
PU	0.187	0.775					
ATT	0.558	0.232	0.812				
PE	0.321	0.233	0.376	0.780			
EE	0.226	0.112	0.281	0.237	0.727		
SI	0.144	0.103	0.146	0.174	0.200	0.870	
SAT	0.131	0.211	0.159	0.232	0.292	0.378	0.752

Note: Constructed by the Author

Structural Equation Model (SEM)

The structural equation model (SEM) verification was conducted in this research after the CFA evaluation. In order to establish whether or not the hypothesized causality explanation fits, a particular combination of linear coefficients is evaluated using the SEM methodology. Additionally, SEM examines the causal relationship between the characteristics in the specified matrix and accounts for assessment bias or dishonesty in the coefficient (Rattanaburi, 2021). Table 6 demonstrates that when adjusted by AMOS version 24, the combined values of CMIN/DF, GFI, AGFI, CFI, NFI, TLI, and RMSEA were all above acceptable limitations. As the outcome reveals, the goodness of fit of the SEM was established.

Table 7

Goodness of Fit for Structural Equation Modeling

Index	Criterion	Source	After Adjust Values
CMIN/DF	< 3.00	Hair et al. (2010)	1.935
GFI	> 0.90	Bagozzi & Yi (1988)	0.903
AGFI	> 0.80	Sica & Ghisi (2007)	0.886
RMSEA	< 0.08	Pedroso et al. (2016)	0.044
CFI	> 0.90	Bentler (1990)	0.955
NFI	> 0.90	Bentler & Bonnet (1980)	0.912
TLI	> 0.90	Bentler & Bonnet (1980)	0.951

Note: Constructed by the Author

Hypothesis Testing Results

According to the outcomes shown in Table 8, perceived ease of use exhibited a direct, significant effect on attitude, resulting in the strongest impact effects in this quantitative approach, a standardized path coefficient (β) of 0.553 (t-value = 4.550***). Social influence provides the second-powerful considerable interaction effect on satisfaction with β at 0.428 (t-value of 2.955***).

Additionally, performance expectancy significantly influenced attitude with the β at 0.227 (t-value at 6.187***), while perceived ease of use markedly impacted perceived usefulness with the β at 0.217 (t-value at 8.235***), as well as effort expectancy which significantly influenced attitude with β at 0.159 (t-value at 2.958***). Moreover, perceived usefulness was also examined and determined to substantially impact attitudes with the β of 0.101 (t-value of 6.189***). Consequently, attitude exhibited the least significant influence on satisfaction in this quantifiable investigation, with 0.097 (t-value at 5.595*).

Table 8

Hypothesis Result of the Structural Equation Modeling

Hypothesis	Paths			Standardlized Path Coeffcient(β)	S.E.	T-Value	Test Result
H1	PU	←	PEOU	0.217	0.048	8.235***	Supported
H2	ATT	←	PU	0.101	0.042	6.189*	Supported
H3	ATT	←	PEOU	0.553	0.047	4.550***	Supported
H4	ATT	←	PE	0.227	0.036	6.187***	Supported
H5	ATT	←	EE	0.159	0.038	2.958***	Supported
H6	SAT	←	ATT	0.097	0.048	5.595*	Supported
H7	SAT	←	SI	0.428	0.041	2.955***	Supported

Note: *** p<0.001, ** p<0.01, * p<0.05
Note: Constructed by the Author

According to the findings in Table 7, with a standardized path parameter threshold of 0.217 for this structural approach, H1 has indicated that perceived ease of use is a considerable

determinant for perceived usefulness. Furthermore, multiple surveys illustrate empirical evidence in furtherance of the significant relationship between the exogenous variable perceived ease of use and the endogenous variable perceived usefulness after the implementation of cutting-edge education and technical innovations (Chen, 2008; Kim et al., 2007; Heijden et al., 2003; Wang et al., 2003; Nagy, 2018).

In H2, the analysis demonstrated that one of the primary characteristics of attitude is perceived usefulness, with a standardized path coefficient of 0.101. Agarwal and Prasad (1999) suggest that attitudes toward using a specific available technology were influenced by perceived usefulness. The perceived usefulness of the assessment generally had a considerable impact on students' sentiments regarding a particular instructional approach (Nagy, 2018).

The observable statistic findings for H3 confirmed the hypothesis that perceived ease of use had a significant consequence on attitude, with the standard coefficient value of 0.553 indicating the greatest significant consequence in this quantification investigation. Numerous studies have demonstrated that attitudes toward implementing a certain methodology or instructional approach are significantly and favorably impacted by perceived ease of use (Taylor & Todd, 1995; Karahanna et al., 1999).

Additionally, H4 demonstrated that performance expectancy significantly impacted participants' attitudes, with a standard coefficient value of 0.227. Performance expectancy originates from human assumptions about their competence to influence their positive or negative attitudes toward the particular information syetem, and is a crucial aspect of a collaborative computational educational environment (Anderson & Kida, 1985; Kasim, 2015; Zboja et al., 2020).

Moreover, H5 confirmed that effort expectancy significantly impacted attitude in this investigation, with a standard coefficient value of 0.159. According to a study conducted by Anderson & Kida (1985), effort expectancy could represent the attitude toward using a specific technology. According to Alshare and Lane (2010), individuals will generate a negative attitude and resist innovation if they consider the system is complicated or sophisticated.

Regarding H6, it was observed that attitude had the significant relationship with satisfaction, resulting in a standard coefficient value of 0.097, which was the weakest effect point in this academic research. Davis (1989) introduced attitude as a crucial component in the technological adoption framework, emphasizing that attitude impacted an individual's behavioral proclivity and satisfaction. The attitude of the samples determined their satisfaction with the precise system (Alshare & Lane, 2010; Ertz & Sarigöllü, 2019).

Eventually, H7 has determined that social influence was significantly associated with satisfaction, as demonstrated by a statistical score of 0.428 on the standard coefficient of the active influence, and the second strongest effect point on the satisfaction in this research. Dowd and Pety (1982) demonstrated that social influence could be characterized by how humans expected that individual to interact to be satisfied. According to Raza et al. (2020), social influence has the greatest powerful interaction effect on satisfaction.

Direct, Indirect, and Total Effects

The conceptual framework of this research included four independent variables, two mediators, and one dependent variable. Figure 2 summarizes the path diagram analysis.

The dependent variable in this investigation was satisfaction, with the R^2 of 0.193, demonstrating that the complete complement of individual variables plus mediator variables accounted for 19.3 percent of the variance in satisfaction. Furthermore, with effect points of 0.428*** and 0.097*, two latent variables directly impacted on satisfaction: social influence and attitude. Moreover, four variables had an indirectly considerable impact on satisfaction: perceived ease of use, performance expectancy, effort expectancy, and perceived usefulness, with influence effect points of 0.053***, 0.022***, 0.015***, and 0.010* correspondingly.

In this quantitative analysis, perceived usefulness was the initial mediator variable, with R^2 at 0.047 demonstrating that perceived usefulness accounts for 4.7 percent of the variance in perceived ease of use. Additionally, there was a 0.217*** direct correlation between perceived ease of use and perceived usefulness.

Eventually, attitude was the additional mediator variable in this research, with R^2 at 0.393 reflecting that perceived ease of use, performance, effort anticipation, and perceived usefulness all attributed 39.3 percent to attitude. Furthermore, the direct influence points for perceived ease of use, performance expectancy, effort expectancy, and perceived usefulness were 0.531***, 0.227***, 0.159***, and 0.101***, respectively.

Figure 2:

Path Diagram Analysis
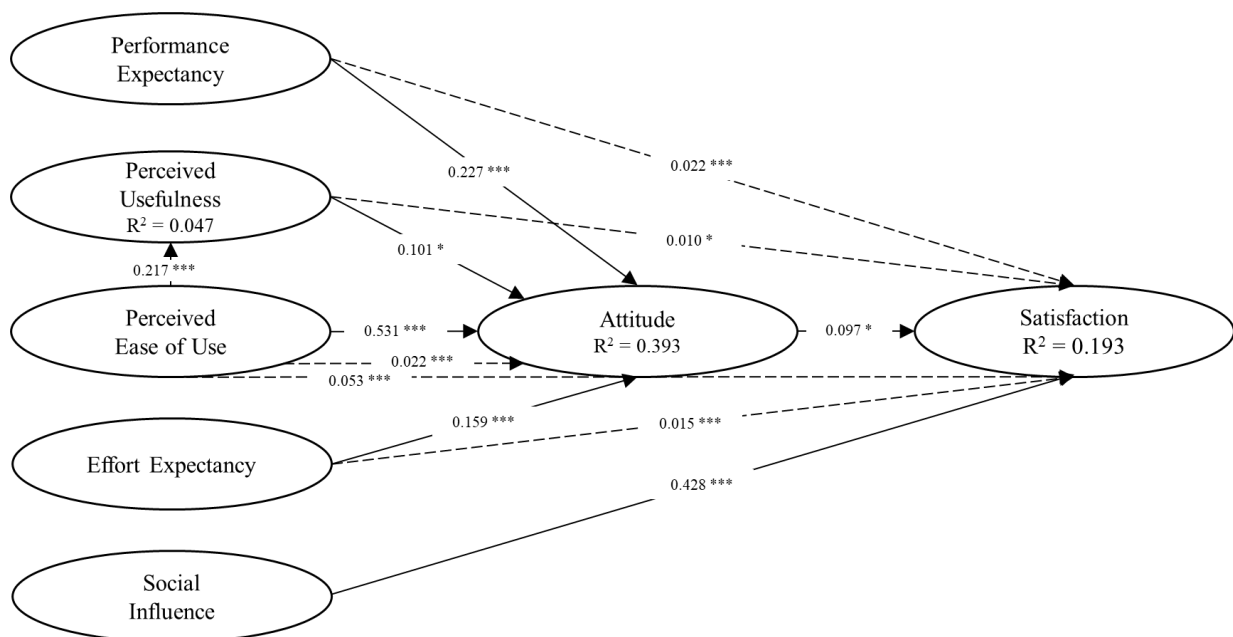
Note: *** p<0.001, ** p<0.01, * p<0.05
Note: Constructed by the Author

Conclusions and Recommendations

Conclusions

This research aimed to determine which factors had significant impact of on art design major undergraduate students' satisfaction regarding online education at four essential public universities in Sichuan province of China. The conceptual framework showed the seven

hypotheses to validate the interaction between perceived ease of use, perceived usefulness, performance expectancy, effort expectancy, attitude, social influence, and satisfaction. In order to determine any interaction among these variables, 487 undergraduate students with experience in online education participated in answering the survey questionnaire. Confirmatory Factor Analysis (CFA) was utilized to determine whether the data fit to the specified theory-derived measurement model. Likewise, the Structural Equation Modeling (SEM) was utilized to evaluate the relationships between observed and latent variables which influence satisfaction, and to test hypotheses.

According to the findings of this research, social influence has the greatest significant direct interaction on satisfaction. Perceived ease of use generated the most powerful influence on attitude. Moreover, performance expectancy, effort expectancy, and perceived usefulness significantly impacted on attitude, with lower standardized path coefficient.

Recommendations for Practice

Based on the results of this quantitative investigation, the researcher offered the following practical recommendations for subsequent online education. First, in this study, social influence is the construct that impacts students' satisfaction with online education. It can be seen that many students choose online education because the positive social environment influences them. Therefore, the teaching unit of the university should fully develop and implement a positive social atmosphere for online education to encourage more students to accept this learning platform.

Secondly, positive learning attitudes toward online education will increase students' satisfaction. In this research, students' satisfaction is affected by four latent variables, of which the most influential is the perceived ease of use. Therefore, in future teaching practice, the teaching units should focus on effectively reducing the technical difficulty of online learning for students, which would be embodied in further optimizing the program design of the online learning platform and providing corresponding tutorial documents and manual assistance, for students to clearly understand that the various learning operations of online learning platform are much simpler, clearer, and even more convenient than traditional classroom teaching. Therefore, this recommendation shall effectively enhance students' positive attitude towards the use of online education platform.

Additionally, from the perspective of perceived usefulness, the instructors should provide considerable amount of teaching materials on the network learning platform according to the technical characteristics of online teaching. Based on the professional characteristics of art design majors, a large scale of design assignments that can be done on Adobe Photoshop, Corel Draw, Illustrator, After Effects, Premiere, Autodesk 3DS Max and a series of more complex professional graphic design software operations, video tutorials could be provided by the online teaching platform outside class hours. This could help, solve students' learning problems, thereby making students realize that effective learning can be facilitated through online education.

Furthermore, in terms of performance expectancy and effort expectancy, teachers should formulate reasonable study plans for students based on the characteristics of art design majors to establish reasonable learning objectives and learning performance assessment for the students. Detailed and comprehensive requirements for performance assessment and

corresponding plans for learning assessment should be outlined for students and communicated through the online learning system.

Ultimately, when the instructors emphasize the perceived ease of use, perceived usefulness, performance expectancy, and effort expectancy of online education based on the above conditions, attitude of students toward online learning could be positively enhanced which could lead to their satisfaction of the learning platform.

Limitations and the Further Exploration

For the practical condition of this investigation, the limitations encompass time: the quantitative research duration is approximately one year. Additionally, the population and sample were limited to four exemplary public universities in southwestern China, and the conceptual framework solely included seven latent variables. Therefore, the following two viewpoints are about further exploration: expanding the research scope into additional regions of China. Moreover, other technology acceptance theories such as Theory of Reasoned Action (TRA), Theory of Planning Behavior (TPB), and Information System Success Model (ISSM) should be explored to develop the conceptual framework.

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Appendix A. Questionaries for the Scale Items

Table 9

Questionaries for the Scale Items

Items	Operationalization	Source
PEOU1	Learning to operate the online learning system is easy for me.	Vululleh (2018)
PEOU2	I find it easy to get the online learning system to do what it to do.	
PEOU3	My interaction with online learning system is clear and understandable.	
PEOU4	It is easy for me to become skillful at using the online learning system.	
PEOU5	I found the online learning system easy to use	
PU1	Using the online learning system can improve my performance.	Vululleh (2018)
PU2	Using the online learning system enables me to accomplish tasks more quickly.	
PU3	Using the online learning system increases my productivity.	
PU4	Using the online learning system can enhance my effectiveness.	
PU5	Using the online learning system makes it easier to learn course content.	
ATT1	Choose the online learning is a good idea.	Alshare & Lane (2011).
ATT2	Online learning makes studying more interesting.	
ATT3	Studying the online learning is fun for me.	
ATT4	I like learning about the online learning system.	
PE1	I would find online learning system useful in my learning.	Mtebe & Raisamo (2014)
PE2	Using online learning system will enable me to accomplish learning activities more quickly.	
PE3	Using online learning system will increase my learning outcome.	
PE4	The use of online learning system will allow me to have access to more information about my courses.	
EE1	My interaction with online learning applications would be clear and understandable.	Mtebe & Raisamo (2014)
EE2	It would be easy for me to become skillful at using online learning.	
EE3	I would find online learning system easy to use.	
EE4	Learning to operate online learning applications is going to be easy for me.	
SI1	People who influence my behavior will think that I should use online learning system.	Mtebe & Raisamo (2014)
SI2	People who are important to me will think that I should use online learning system.	
SI3	The lecturers and other staff at my institution will be helpful in the use of online learning.	
SI4	In general, my institution will support the use of online learning system.	
SAT1	I am satisfied with the whole system of online learning.	Harsasi & Sutawijaya (2018)
SAT2	Overall, online learning system is already well.	
SAT3	Overall, online learning has been successfully for me.	
SAT4	Learning through online learning system enable me to learn independently.	
SAT5	I will keep learning through the online learning system in the future.	