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Determinants of Behavioral Intention to Use Hybrid Education Among Painting Students in Public Universities in Chengdu, China

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Abstract

Purpose: The purpose of this study is to examining determinants of behavioral intention to use hybrid education among undergraduate students, majoring in painting at three public universities in Chengdu, China. Key variables are perceived ease of use (PEOU), perceived usefulness (PU), perceived satisfaction (PS), social influence (SI), performance expectancy (PE), facilitating conditions (FC), and behavioral intention (BI). **Research design, data, and methods:** The researchers used quantitative method by distributing questionnaire to 500 participants via offline and online channels. The sampling techniques involve judgmental, quota and convenience samplings. The content validity was approved by three experts, applying Item Objective Congruence (IOC) Index. All constructs were reserved by Cronbach's Alpha coefficient values by pilot testing of 30 participants. Afterwards, Confirmatory Factor analysis (CFA) and Structural Equation Model (SEM) were executed in the data analysis, including goodness-of-fit, validities, and reliabilities. **Results:** All latent variables had a significant influence on behavioral intention. In addition, perceived ease of use had the strongest significant influence on perceived usefulness. **Conclusion:** Future researchers are recommended to extend the research model in considering to more variables in technology adoption theories in different region. Universities could improve hybrid education system to uplift students' engagement and learning performance.

Keywords: Hybrid Education, Performance Expectancy, Social Influence, Facilitating conditions, Behavioral Intention

JEL Classification Code: E44, F31, F37, G15

1. Introduction

Higher education had undergone a major shift in the 21st century. In 2002, the Chronicle of Higher Education noted that the combination of online and physical instruction is the most growing trend in higher education industry. Several reports predict that the number of hybrid courses (i.e.,

blended courses) in higher education will proliferate to 80 to 90 percent of all systems (Young, 2002). Advances in instructional technology have dramatically increased the number of courses available, making higher education more accessible to more students than ever before. According to Osguthorpe and Graham (2003), there are six reasons why individuals prefer to create or utilize a hybrid education

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system. Firstly, the approach provides a rich educational experience, appropriate access to information, adequate social connections, acceptable personal motivation, significant cost effectiveness, and simplicity of modification.

With hybrid education, the painting program can achieve academic objectives through interactive mode of online information. Furthermore, teachers can develop one-on-one lesson plans for each student's learning and test results, allowing students to identify knowledge gap in a timely manner. For the implementation of hybrid learning model, students can use modern teaching equipment to analyze and reinforce these issues in depth through the teacher's explanation of classroom content, problems, and the ambiguous knowledge system during the self-test. During the pandemic situation, the hybrid teaching and learning model can effectively limit the spread of virus, which clearly accelerate the market growth and the rapid technology development of hybrid education.

1.1 Objectives of this Research

- a) To investigate the determinants of behavioral intention toward hybrid education among undergraduate students in a painting major in three public universities in Chengdu, China.
- b) To investigate the causal relationship between variables that have significant influence on behavioral intention to use hybrid education.
- c) To make recommendations for ensuring the successful adoption of hybrid education system in order to maximizing students' learning performance.

1.2 Conceptual Framework

The previous literatures and models are reviewed in the development of conceptual framework of this study as presented in Figure 1. Two major technology adoption models are compiled which are technology acceptance model (TAM) and UTAUT. Shin and Kang (2015) investigated the significant relationship between perceived ease of use (PEOU), perceived usefulness (PU), and behavioral intention (BI). Cigdem and Ozturk (2016) examined that perceived satisfaction significantly influenced behavioral intention. Mtebe and Raisamo (2014) found the support relationships among performance expectancy (PE), social influence (SI), facilitating conditions (FC), and behavioral intention (BI).

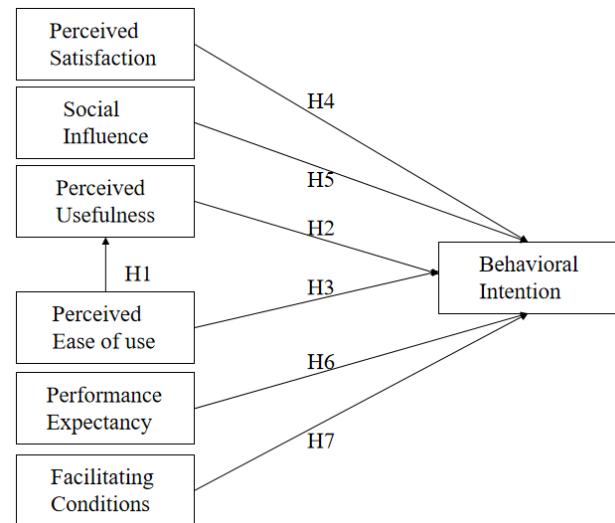


Figure 1: Conceptual Framework
Source: Created by the author

1.3 Significance of the Study

The study determines a clear concept of factors affecting behavioral intentions behavioral intention of student to adopt hybrid education to enhance their learning performance. In addition, researchers have found that the technology adoption is keen to the behavioral intention to use a technology (Netemeyer & Bearden, 1992). The stronger a person's desire to do something, the more likely an activity will occur. Firstly, the findings contribute to assisting universities program providers to design the simple and useful hybrid learning system to enhancing the behavioral students. It can provide a concrete recommendation for lecturers to improve teaching quality both physically and virtually. Secondly, the universities can manage the hybrid module in terms of cost maximization, promotion of benefits used and infrastructure design for hybrid education. Lastly, the results of this research can be extended in the future study of technology adoption in higher education sector.

2. Literature Review

2.1 Perceived Ease of Use

The perceived ease of use is derived from TAM, with the given definition that a use of new technology is simple and fast-learning (Elkaseh et al., 2016). Perceived ease of use is signified as perceptions related to how users believe that the target system can be used without too much effort (Bashir & Madhavaiah, 2015). According to Davis (1989), original

TAM pointed perceived ease of use has a direct effect on behavioral intention. In some other theorists, they found that perceived ease of use is a key indicator of perceived usefulness of a system technology. To extend, perceived ease of use is the user's perception of how easy a technology is to use which has a significant influence on their perception that it will provide them benefits (Venkatesh, 2000; Yang & Wang, 2019). Multiple research projects reported that this perspective influences human behavior and propensity to use the target system (Lee, 2009; Venkatesh, 2000). Based on above discussions, hypotheses are proposed:

H1: Perceived ease of use has a significant influence on perceived usefulness of hybrid education.

H3: Perceived ease of use has a significant influence on behavioral intention of hybrid education.

2.2 Perceived Usefulness

Perceived usefulness has been characterized as the tendency to influence human behavior and usage of a target system by lowering the perception of risk (Venkatesh, 2000). Perceived usefulness can predict students' adoption of new educational technologies (Elkaseh et al., 2016). The learner's motivation and the influence of e-learning technology in an essential, as well as how it can provide several advantages (Vululleh, 2018). According to TAM's educational technology showed that perceived ease of use has a direct impact on behavioral to use (Huang & Duangekanong, 2022; Teo, 2009). When deciding whether to utilize a system, perceived usefulness is viewed as the most significant factor to consider in a technology adoption process (Davis, 1989). It can be simply said that people will have an intention to sacrifice their time and effort in using something when they earn some benefits or rewards as expected (Arbaugh & Ben, 2002). Therefore, a hypothesis is developed:

H2: Perceived usefulness has a significant influence on behavioral intention of hybrid education.

2.3 Perceived Satisfaction

Several studies have practically found that the system quality is substantially produces with users' favorable and unfavorable feelings. Researchers have discovered in different demographic and cultural characteristics of the impact on the design of effective online learning technologies (Francisco et al., 2012). Student satisfaction can be measured learner-instructor engagement, content quality, effective interaction, and technological efficacy. According to Zhang and Lin (2020), Learning satisfaction has been widely considered to be one of the most essential indicators of academic achievement, and many say that it

should be of higher education's primary goals (Appleton-Knapp & Krentler, 2006). Furthermore, customer satisfaction is defined as a consumer's pleasant and unpleasant experience with a firm which potentially predict the intentional behavior (Tanasapsakul & Vongurai, 2018). As a result, a hypothesis is derived.

H4: Perceived satisfaction has a significant influence on behavioral intention of hybrid education.

2.4 Social Influence

Fishbein and Ajzen (1977) developed the idea of social influence (also known as subjective norms). Collis and Moonen (2002) used social influence to predict the usage of educational media among users which is dominant by their friends, family, and community. According to many experts, social influence has both good and bad impacts on people's behavioral intention (Vermeir & Verbeke, 2006). Previous study has demonstrated that students can be convinced to do or not do something by other students' opinions (Miller et al., 2003). Previous researchers assumed that social influence is based on systematic acceptance which greatly impacted behavioral intention to use a new technology (Mtebe & Raisamo, 2014). Based on previous studies, H5 is set:

H5: Social influence has a significant influence on behavioral intention of hybrid education.

2.5 Performance Expectancy

Performance expectancy is described as a person's belief that using a technology would help them enhance their performance, which greatly predict their behavioral intents, (Venkatesh et al., 2016). Performance expectancy is described as the degree to which an individual embraces any new technology by analyzing his/her expectation with how good the system can improve work performance or the individual's ability to fulfill responsibilities (Davis, 1989; Venkatesh et al., 2012). As discussed in multiple technology adoption theories, performance expectancy has been confirmed to be a substantial predictor of user's acceptance of a technology (Adedaja et al., 2013). For example, hybrid education provides more flexible approach to language acquisition which users could develop behavioral to use it to serve their expectation (Zarei & Kaur, 2019). Accordingly, a following hypothesis is constructed:

H6: Performance expectancy has a significant influence on behavioral intention of hybrid education.

2.6 Facilitating Conditions

Facilitation conditions are defined as the assisting process for people to use available and necessary resources

for engaging a new technology (Teo & Noyes, 2014). Facilitation conditions are also characterized in a technology adoption process as factor influencing the willingness to use a technology among users (Teo, 2011). In hybrid education context, active learning mode can improve the teaching and learning process which can be facilitated by many elements such as a range of technology, online educational materials, technical support etc. (Zarei & Kaur, 2019). Personal aspects like computer literacy, self-efficacy, technological complexity, and environmental factors have a considerable effect on behavioral intention as evidenced from previous literatures (Ngai et al., 2007; Thong et al., 2002; Tsai et al., 2010). With above evidences, a final hypothesis is proposed: **H7**: Facilitating conditions have a significant influence on behavioral intention of hybrid education.

2.7 Behavioral Intention

According to TAM, a person's desire to adopt new technology influences his behavioral intention to use. Behavioral intention provides a concept that an individual is more likely to behave or act in a specific way (Davis, 1989). Behavioral intention is crucially derived from many influencers such as perceived ease of use, perceived usefulness, satisfaction, social influence, facilitating conditions etc. In this research, behavioral intention determines a learner's use of an e-learning system (Damjanovic et al., 2015; Lee et al., 2005; Sahin & Shelley, 2008). Researchers discovered that cross-industry technology adoption showed a significant impact of intention to use obtained by various factors (Netemeyer & Bearden, 1992). The stronger a person's desire to do something, the more likely he/she will actually try it (Valerand et al., 1992). The amount of effort a person is willing to put out to complete a task, or the degree to which a person is willing to put forth effort to achieve a desired behavior, is referred to as intention (Ajzen, 1991).

3. Research Methods and Materials

3.1 Research Methodology

This quantitative study applied nonprobability sampling method to distributing survey to undergraduate students of three public universities in the Chengdu, who have previously experienced hybrid education. Three universities are Chengdu University (CDU), Sichuan Normal University (SNU) and Sichuan Conservatory of Music (SCM). The questionnaire is designed in three parts. Initially, screening questions were carried out to qualify survey respondents (Voß et al., 2021). Next, demographic information were obtained including gender and year of study (Lodico et al.,

2006). Finally, a five-point Likert scale was used for measuring items, with a score of 5 indicating absolute agreement, and 1 indicating extreme disagreement (Salkind, 2017).

Three experts and professional were carefully selecting, profiling of PhD and educational executives who were invited to complete an item-objective congruence (IOC) index of content validity. The results were that all scale items were accepted at the score above 0.67. In term of the validity assessment by pilot test, Clark-Carter (2018) suggested that 30 respondents were sufficient. Nevertheless, this study conducted a preliminary test of internal consistency reliability using Cronbach's Alpha scale with 30 college students, resulting all constructs are reserved at the score 0.70 or above. For the data collection, questionnaires were distributed to 500 undergraduate students of three universities. SPSS and AMOS were accounted as statistical tools examining confirmatory factor analysis (CFA) and structural equation modeling (SEM).

3.2 Population and Sample Size

The target population of this study were undergraduate students majoring in painting from three public universities in the Chengdu, China which are Chengdu University (CDU), Sichuan Normal University (SNU), and Sichuan Conservatory of Music (SCM). According to Israel (1992), the minimum sample size for a complex framework in SEM should be 200-500 respondents. Through judgmental and quota samplings, 500 students were selected as the final sample from total population of 880.

3.3 Sampling Techniques

Multiple steps were involved in sampling. Firstly, the researchers used judgmental sampling to identify 880 undergraduate painting students from three public universities in the Chengdu, China area who had previously participated in at least one month of hybrid education. Quota sampling was accounted to divide strata of each sub group, totaling 500 participants. For convenience sampling, the distribution of questionnaire was made offline via administration offices and online via email, chat application and social platforms.

Table 1: Sample Units and Sample Size

Target Public Universities	Student Grade	Population Size Total = 880	Proportional Sample Unit Size Total = 500
Chengdu University (CDU)	Freshman	95	55
	Sophomore	65	37
	Junior	50	28

	Senior	50	28
Sichuan Normal University (SNU)	Freshman	70	40
	Sophomore	85	48
	Junior	90	51
	Senior	80	45
Sichuan Conservatory of Music (SCM)	Freshman	70	40
	Sophomore	60	34
	Junior	105	60
	Senior	60	34

Source: Created by the author.

4. Results and Discussion

4.1 Demographic Information

The demographics of the 500 respondents were 23.56% of male, and 76.44% of female. In terms of college affiliation, 29.4% were students from Chengdu University (CDU), 37.0% were from Sichuan Normal University (SNU), and 33.6% were from Sichuan Conservatory of Music (SCM). For the year of study, 26.9% were freshmen, 23.9% were sophomores, 27.8% were juniors, and 21.4% were seniors. Additionally, 24.5% of the respondents are

from oil painting majors, 21.8% from watercolor painting majors, 9.3% from printmaking majors, 20.2% from comprehensive art majors, and 24.2% of the students have not yet determined their own major direction.

4.2 Confirmatory Factor Analysis (CFA)

CFA was used to verify that the number of constructs and the factor loadings of the observed variables (Malhotra et al., 2004). The significance of the factor loadings and significance for each observed variable indicates a fit model (Hair et al., 2006). The measurement model was adjusted to 2.812 of degrees of freedom (CMIN/DF), goodness-of-fit index (GFI) of 0.89, adjusted goodness-of-fit index (AGFI) of 0.868, normalized fit index (NFI) of 0.881, comparative fit index (CFI) of 0.919, the Tucker-Lewis index (TLI) was 0.909, and the root mean square error of approximation (RMSEA) was 0.06. Therefore, the results presented acceptable model fit in the CFA.

According to the statistical results of CFA summarized in Table 2, all values are approved at Cronbach's Alpha of above 0.70, factor loadings of above 0.30, t-values of above 1.98, p-values of less than 0.50, composite reliability (CR) of above 0.70, and average variance extracted (AVE) of above 0.50 (Fornell & Larcker, 1981).

Table 2: Confirmatory Factor Analysis Result, Composite Reliability (CR) and Average Variance Extracted (AVE)

Latent Variables	Source of Questionnaire	No. of Items	Cronbach's Alpha	Factor Loadings	CR	AVE
Perceived Ease of Use (PEOU)	Cigdem and Öztürk (2016)	5	0.848	0.561-0.904	0.857	0.555
Perceived Usefulness (PU)	Cigdem and Öztürk (2016)	6	0.883	0.635-0.901	0.890	0.579
Perceived Satisfaction (PS)	Mtebeb and Raisamo (2014)	4	0.849	0.585-0.925	0.863	0.620
Social Influence (SI)	Mtebeb and Raisamo (2014)	4	0.864	0.688-0.884	0.868	0.624
Performance Expectancy (PE)	Mtebeb and Raisamo (2014)	4	0.884	0.701-0.900	0.887	0.665
Facilitating Conditions (FC)	Mtebeb and Raisamo (2014)	4	0.872	0.609-0.915	0.880	0.652
Behavioral Intention (BI)	Shin and Kang (2015)	4	0.856	0.614-0.867	0.865	0.619

Source: Created by the author.

The convergent validity was determined when the value of CR is above AVE, whereas the AVE is higher than 0.50 (Hair et al., 2006). The values of the discriminant validity were examined and demonstrated in Table 3, exceeding the critical point values. Subsequently, the convergent validity and the discriminant validity of this research were sufficient (Fornell & Larcker, 1981).

Table 3: Discriminant Validity

	PEOU	PU	PS	SI	PE	FC	BI
PEOU	0.745						
PU	0.380	0.761					
PS	0.293	0.353	0.787				
SI	0.328	0.268	0.201	0.790			
PE	0.351	0.335	0.265	0.281	0.815		
FC	0.37	0.326	0.316	0.242	0.326	0.807	
BI	0.358	0.303	0.259	0.294	0.269	0.364	0.787

Note: The diagonally listed value is the AVE square roots of the variables

Source: Created by the author

4.3 Structural Equation Model (SEM)

After the CFA process, the structural equation model (SEM) was conducted to estimate a particular system of linear equations and verify the model fit. Furthermore, SEM determines the causal relationship among variables in a structural model (Jaruwanakul, 2021). The results were illustrated in Table 4 adjusted by SPSS AMOS program, with all the accepted values of CMIN/DF, GFI, AGFI, CFI, TLI and the RMSEA. Consequently, structural model for this research was approved.

Table 4: Goodness of Fit for Structural Model

Index	Criterion	Source	After Adjustment Values
CMIN/DF	< 5.00	(Al-Mamary & Shams uddin, 2015)	1193.914/420 or 2.843
GFI	≥ 0.85	(Sica & Ghisi, 2007)	0.854
AGFI	≥ 0.80	(Sica & Ghisi, 2007)	0.827
NFI	≥ 0.80	(Wu & Wang, 2006)	0.878
CFI	≥ 0.80	(Bentler, 1990)	0.917
TLI	≥ 0.80	(Sharma et al., 2005)	0.908
RMSEA	< 0.08	(Pedroso et al., 2016)	0.061

Source: Created by the author.

4.4 Research Hypothesis Testing Result

According to Figure 2, the significance of each variable is based on the regression weights and R² variance. Hypotheses are significantly supported with p-values less than 0.05. The research hypothesis testing results are shown in Table 5. The strongest influence showed in the relationship between perceived ease of use on perceived usefulness with a standardized path coefficient (β) of 0.305 (t-value = 7.035***). Furthermore, perceived usefulness on behavioral intention had β of 0.161 (t-value = 3.175**), perceived ease of use on behavioral intention had β of 0.145 (t-value = 2.832**), perceived satisfaction on behavioral intention had β of 0.103 (t-value = 2.167*), social influence on behavioral intention had β of 0.169 (t-value = 3.482**), performance expectancy on behavioral intention had β of 0.129 (t-value = 2.702**), and facilitating conditions on behavioral intention β of 0.127 (t-value = 2.853**). Thus, all hypotheses were significantly supported with p-values less than 0.05.

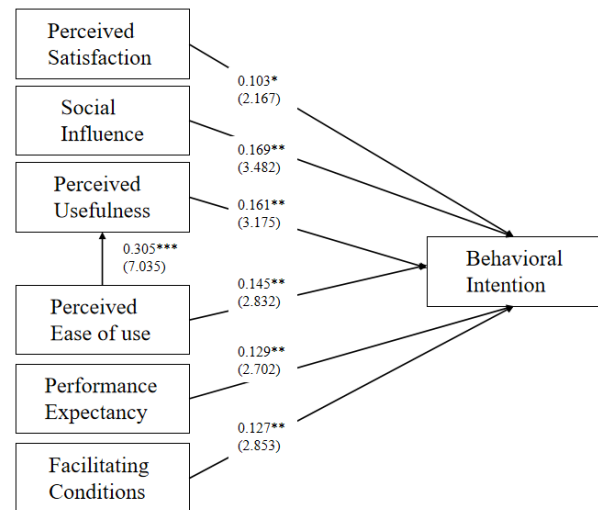


Figure 2: Structural Equation Modeling (SEM)

Note: *** p<0.001, ** p<0.01, * p<0.05

Source: Created by the author

Table 5: Hypothesis Results of the Structural Equation Modeling

Hypothesis	Standardized Coefficients (β)	S.E.	t-value	Result
H1: PEOU→PU	0.305	0.080	7.035***	Supported
H2: PU→BI	0.161	0.059	3.175**	Supported
H3: PEOU→BI	0.145	0.110	2.832**	Supported
H4: PS→BI	0.103	0.064	2.167*	Supported
H5: SI→BI	0.169	0.048	3.482***	Supported
H6: PE→BI	0.129	0.049	2.702**	Supported
H7: FC→BI	0.127	0.067	2.853**	Supported

Note: *** p<0.001, ** p<0.01, * p<0.05

Source: Created by the author.

Based on the above results, the researchers derived the following extensions.

H1 affirmed that perceived ease of use is one of the significant influencers of perceived usefulness, with a standardized path coefficient value of 0.305 in the structural model. Vululleh (2018) noted that perceived ease of use can contribute to students' positive evaluation of the derived benefits from the use of hybrid education.

For H2, the support relationship was confirmed between perceived usefulness and behavioral intention, representing a standardized coefficient value of 0.161. If students perceive that a hybrid education system to be easy to use, they tend to adopt it (Huang & Duangekanong, 2022).

From the findings of H3, perceived ease of use significantly influenced behavioral intention, reflecting a standard coefficient value of 0.145. It can be assumed when students feel hybrid education system is simple and easy to use, they are willing to use it (Teo, 2011).

In H4, perceived satisfaction was hypothesized to be significant on behavioral intention, indicating a standard coefficient value of 0.103. Perceived satisfaction has been commonly used to assess the success or failure of a system, or is described as a person's perception and comfort level with an information system. Studies have shown that perceived satisfaction directly influences learners' behavioral intention to use hybrid education (Damjanovic et al., 2015; Lee et al., 2005; Sahin & Shelley, 2008).

H5 presented the support relationship between social influence and behavioral intention, showing standard coefficient value of 0.169. The influencers of students can be peers, parents and teachers who convince them to use hybrid learning to achieve their academic goals (Frye & Dornisch, 2015).

H6 supported the hypothesis that performance expectancy significantly influenced behavioral intention, presenting a standard coefficient value of 0.129. The researchers found that performance expectancy of students has a great impact on behavioral intention to use hybrid education (Zarei & Kaur, 2019).

H7 presented that the significant results between facilitating conditions and behavioral intention, determining a standard coefficient value of 0.127. Facilitating conditions determine students' intention to use hybrid education (Teo, 2011).

5. Conclusions and Discussion

5.1 Conclusion

This paper achieves to verify the significant determinants of behavioral intention to use hybrid education system of undergraduate students majoring in painting in public university in Chengdu, China. A number of hypotheses were formulated in a conceptual framework. A questionnaire was distributed to 500 undergraduate students who had at least one month of hybrid learning experience. Statistical analysis was conducted through confirmatory factor analysis (CFA) to test the validity and reliability of the data. In addition, structural equation modeling (SEM) was used to verify the structural model and hypotheses testing. The findings showed that perceived ease of use had the strongest significant influence on the perceived usefulness. This finding is consistent with previous research by Davis (1989) that perceived ease of use has a direct effect on perceived usefulness towards behavioral intention. Perceived satisfaction had a significant influence on behavioral intention. Satisfaction with learning has been considered one of the most fundamental markers of intentional behavior to use hybrid education (Appleton-Knapp & Krentler, 2006). Furthermore, the influence by

their friends, family or teachers can greatly influence the willingness to use hybrid education among students (Vululleh, 2018). In addition, performance expectancy had a significant influence on students' behavioral intention to use hybrid education, indicating the extent to which students perceive that adopting such learning format could help them to improve their academic performance (Wang et al., 2003). Overall, the successful hybrid education's adoption should be keen to the significant determinants in designing learning module, teaching materials and strategic communication to both existing and prospective students.

5.2 Recommendation

As a result of COVID-19, Chinese higher education institutions have been forced to shut down on-campus approach and rapidly shift to the virtual mode of teaching and learning. When the pandemic situation improves, schools and universities have been shifted to the preventive mode and have transformed to a hybrid education approach of learning like never before. The cases studied in this paper explores the core factors of behavioral intention to adopt the hybrid learning among undergraduate students at three public universities in Chengdu. Therefore, it is recommended that these experiences can be drawn upon the design and reform of future hybrid education programs, especially painting majors which are difficult to migrate all learning materials and practices to online platform. To achieve more desirable outcomes of hybrid learning adoption among students, it requires administrative support, curriculum design, social and technical support, and different strategies for students to enhancing their learning performance physically and virtually. Finally, in response to both theory and practical implications, course designers and instructional programmers are recommended to sourcing available tools such as software, applications or platforms to serve the nature of painting curriculum for students' behavioral intention to comply with hybrid education as well as to improve their learning performance.

5.3 Limitation and Further Study

This study was limited to undergraduate students majoring in painting at three public universities in Chengdu, China. Further research can focus more on how students in other geographical area in China or other countries embracing new learning models in the design of hybrid education programs for achieving learning outcomes. Furthermore, future research could consider to extend the research model to exploring some other substantial variables such as trust, information quality, system quality and vice versa. Focus group and interview are recommended to be accounted for the qualitative analysis.

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