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Determinants of Satisfaction and Intention to Use Online Learning in Higher Education Among Undergraduate Students in Public Universities in Guangdong, China

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Abstract

Purpose: This study explores student satisfaction and willingness to participate in online higher education across three universities in Guangdong Province. The conceptual framework incorporates variables such as learning materials, infrastructure, academic staff, degree programs, perceived usefulness, student satisfaction, and intention to use. **Research design, data, and methodology:** Quantitative methods were employed, with 450 undergraduates from three universities in Guangdong Province participating in the survey. Non-probability sampling techniques were utilized, including judgment sampling for selecting undergraduates from the universities, quota sampling for defining the sample scope, and convenience sampling for collecting online distribution surveys. Structural equation modeling (SEM) and confirmatory factor analysis (CFA) were employed for data analysis, encompassing model fitting and assessing the reliability and validity of structures. **Results:** Learning material, academic staff, infrastructure facilities and perceived usefulness significantly impact student satisfaction. Perceived usefulness and student satisfaction have a significant impact on student intention to use. Nevertheless, degree program has no significant impact on student satisfaction. **Conclusions:** As a result, it is recommended that the universities in Guangdong focus on enhancing the professionalism of academic staff, learning materials, infrastructure, and perceived usefulness to enhance student satisfaction with online learning and their willingness to utilize it.

Keywords: Learning Material, Infrastructure Facilities, Academic Staff, Student Satisfaction, Intention to Use

JEL Classification Code: E44, F31, F37, G15

1. Introduction

Few researchers suggest that contact, whether in person or online, should be emphasized and investigated in all modes of education (Warden et al., 2022). It is a way for students to seek out new knowledge and build relationships with teachers, fellow students, and their study topic. Learners' learning results are influenced greatly by their participation in learning activities. Research done during the COVID-19 epidemic by Saxena et al. (2020) found that interaction was the most important component in determining students' online learning satisfaction and learning results (Peechapol et al., 2018). As a result of technology limitations and literature on distance education, interactions in online learning have yet to be achieved, which is remarkable. The importance of student-to-student interaction has yet to be adequately explored in the literature on remote education. Another study found that students who took online courses were more dissatisfied than those who took face-to-face sessions. When students connect with their teachers and with the subject, three distinct types of interactions might occur (Corry & Stella, 2018).

Several studies have shown that e-learning is more effective than traditional learning. This teaching technology reduces educational barriers by eliminating time and geographical constraints (Demuyakor, 2020). Another advantage of e-learning is its flexibility. Students can access online courses anytime and anywhere, making them lifelong

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learners. However, e-learning also has certain disadvantages, such as lack of access and participation and network problems (Tiejun, 2021). Before the COVID-19 pandemic, online learning was only one of Chinese schools' most widely used teaching technology. Like other countries, China supports rapidly adopting this innovative teaching method in school curricula. Most higher education institutions are preparing to shift from traditional to virtual classrooms before the pandemic is over. However, there needs to be more information on the acceptability of e-learning in China. Therefore, this study aims to determine the impact on higher education students' online learning well-being and their intention to use online learning.

2. Literature Review

2.1 Learning Material

Viewing study materials, the number of course syllabi, and online lectures are the most used tools (Dziuban et al., 2015). Draus et al. (2014) found that whether students watch teaching materials regularly and the length of time they watch videos greatly impacts their academic performance. Kirmizi (2015) examined the relationship between total time spent watching instructional videos, number of logins, late submission scores, number of responses to course messages, and number of messages created in final course scores to predict student course grades. The study's results found a positive relationship between the total time spent viewing instructional materials, the number of logins, and the amount of information generated. Thus, this study put forwards a hypothesis:

H1: Learning material has a significant impact on student satisfaction.

2.2 Infrastructure Facilities

Gouda et al. (2013) found that well-equipped colleges and universities are more operable, and students are more involved in online education, thus providing students with learning opportunities and improving student satisfaction. Technology in the infrastructure of colleges and universities significantly impacts student engagement (Gebre et al., 2014). Sujarwo et al. (2018) proposed that having good technology integration in learning is closely related to student engagement and is key to encouraging active student participation. Sholihah (2019) found that e-libraries prompt students to engage in demanding academic activities requiring higher-level thinking.

Juneja and Sholihah (2019) found that having good infrastructure in colleges and universities can improve students' attention, even in online education. Students pay attention to their studies, thereby improving student satisfaction. Shirokova et al. (2017) state that providing fully functional teaching equipment benefits enrollment and indicates student engagement. This connection is even more pronounced with remote courses. Kaplan (2015) found that good infrastructure can significantly improve students' concentration and learning attitude. Thus, this study put forwards a hypothesis:

H2: Infrastructure facilities have a significant impact on student satisfaction.

2.3 Academic staff

Pirohová and Lenhardtová (2020) observed that the effectiveness of academic staff is influenced not only by their abilities, knowledge, and experience but also by their willingness and commitment to utilize their potential in teaching fully. This willingness encompasses communication skills, study skills, problem-solving abilities, and the adept use of communication technologies. In the realm of higher education, the proficiency of academic staff, including their ability to realize their full potential, significantly impacts student satisfaction. Buhari (2013) argued that professionalism among academic staff is essential for smoothly functioning the teaching and learning process. Additionally, Van (2012) defines student satisfaction as the attainment of a performance experience that aligns with expectations. This involves the conduct and communication of lecturers and staff and their knowledge and procedures in delivering services. Moreover, the working conditions of university tutors can influence students' engagement and satisfaction (Mushemeza, 2016). Thus, this study put forwards a hypothesis:

H3: Academic staff has a significant impact on student satisfaction.

2.4 Degree Program

Students' motivations for choosing a degree indicate their expectations of the degree program (Tovar, 2015). According to Allen and Dadgar's (2012) self-determination paradigm, motivation can be intrinsic or extrinsic. Despite the wide range of research on college students, only a few studies have focused on student satisfaction and the college experience as a meaningful research topic. It is well known that students have a wide range of personality traits, backgrounds, and interests (Tessema et al., 2012). Undergraduates are more interested in diverse degree programs, the reasons for attending college, the desire to participate in educational decisions, and so on. As they enter college, their beliefs about the nature and purpose of college education vary widely. Thus, undergraduate students' satisfaction with degree programs is correlated with their satisfaction with their

intention to use their university education (Valerio et al., 2014). The scholarship structure may encourage students to choose degree programs early (Beauvais et al., 2014). Thus, this study put forwards a hypothesis:
H4: Degree program has a significant impact on student satisfaction.

2.5 Perceived Usefulness

Researchers often use perceived usefulness in e-learning. For example, Abdullah et al. (2016) states that students' satisfaction with the utility of electronic media in delivering courses will improve their perceived usefulness to courses and encourage them to pursue online courses in the future. Liaw and Huang (2013) considered perceived usefulness as an exogenous factor. Hess et al. (2014) studied how people view e-learning systems and the factors that affect satisfaction. According to the empirical investigation, the key drivers of perceived usefulness are curriculum delivery, teacher quality, and enabling environment.

Similarly, Racherla and Friske (2012) found that ease of use was the most important factor in perceived usefulness, consistent with TAM. For online learning, another way to deal with perceived utility is to study the effectiveness of this structure as a measure of success in e-learning. Joo et al. (2011) established the e-learning success variable and conducted different studies to investigate the function of this concept in the success evaluation of e-learning systems. The results of these studies demonstrate that perceived effectiveness is a viable criterion for evaluating e-learning. Thus, this study put forwards below hypotheses:
H5: Perceived usefulness has a significant impact on student satisfaction.
H6: Perceived usefulness has a significant impact on student intention to use.

2.6 Student Satisfaction

Cole et al. (2014) outlined four significant factors influencing student well-being and satisfaction in online courses: online facilities, degree program content, learning communication, and learner effectiveness. Within the education sector, student satisfaction hinges on interactions and communication between educators and students, leading to the development of comprehensive satisfaction models. Guo et al. (2013) introduced a method to define customer satisfaction to bridge existing research gaps. Key variables contributing to students' satisfaction with e-learning include infrastructure, academic tutors' expertise, degree program design, course effectiveness, teachers' responsiveness to e-learning, and user-friendly interfaces (Dziuban et al., 2015). Kuo et al. (2013) suggested an approach to defining customer happiness, which may aid in addressing research deficiencies. Thus, this study put forwards a hypothesis:
H7: Student satisfaction has a significant impact on student intention to use.

2.7 Intention to Use

Enhancing satisfaction is paramount in bolstering students' willingness to utilize educational services. Teo (2011) posited that augmenting usage intention hinges on improving perceived effectiveness and ease of use. Similarly, Al-Maroof et al. (2021) emphasized that perceived usefulness and ease of use are pivotal factors in fostering continued usage. Tussyadiah (2016) uncovered a positive impact of perceived usefulness and perceived effectiveness on participants' inclination to utilize services. Online courses' ease of use and effectiveness significantly contribute to user satisfaction, consequently influencing educational satisfaction and fostering positive usage intentions (Payre et al., 2014). Additionally, research by Jang and Kim (2020) highlighted a favorable relationship between satisfaction and the inclination to use social networking services (SNS). These studies demonstrate a positive correlation between satisfaction and the intention to use.

3. Research Methods and Materials

3.1 Research Framework

The conceptual framework of this study was constructed through an analysis of prior research frameworks, incorporating insights from four distinct theoretical models. Kaur and Bhalla (2018) examined the impact of learning materials (LM) and infrastructure facilities (IF) on student satisfaction (SS). Furthermore, Weerasinghe and Fernando (2018) elucidated the influence of academic staff (AS) and degree programs (DP) on student satisfaction (SS). Kashive et al. (2020) contributed by investigating the relationship between perceived usefulness (PU) and student satisfaction (SS), subsequently affecting intention to use (ITU). Lastly, Bag et al. (2022) proposed the association between perceived usefulness (PU) and intention to use (ITU). Figure 1 illustrates the integration of these studies to provide a comprehensive understanding of the factors impacting student satisfaction and intention to use.

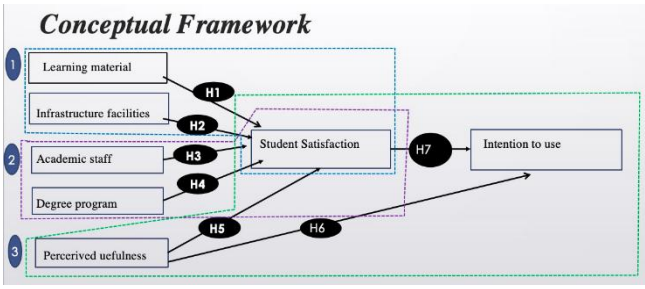

Figure 1: Conceptual Framework

H1: Learning material has a significant impact on student satisfaction.
H2: Infrastructure facilities have a significant impact on student satisfaction.
H3: Academic staff has a significant impact on student satisfaction.
H4: Degree program has a significant impact on student satisfaction.
H5: Perceived usefulness has a significant impact on student satisfaction.
H6: Perceived usefulness has a significant impact on student intention to use.
H7: Student satisfaction has a significant impact on student intention to use.

3.2 Research Methodology

The researchers used a non-probability sampling method to conduct an online questionnaire survey among undergraduate students from three universities in Guangdong Province. The survey was divided into three parts. Three higher education institutions in Guangdong Province, China, were first selected, and this criterion was used to ensure that the sample was representative of the entire geographical area of Guangdong. Second, demographic issues are gender, age, educational background, and when online education began. Finally, the seven proposed variables were measured using a 5-point Likert scale ranging from strongly disagree (1) to agree (5) to analyze all hypotheses strongly.

Before data collection commenced, a panel of three experts rigorously evaluated the Index of Item-Objective Congruence (IOC) to ensure the alignment of each item with its intended construct, thereby bolstering the validity of the assessment to a score exceeding 0.7. Subsequently, a pilot test involving 30 participants was conducted to establish a robust scale. For this purpose, 50 prospective participants were selected by the researcher, and internal consistency reliability was analyzed using Cronbach's Alpha coefficient. The resulting Cronbach's Alpha score exceeded 0.7, affirming the dependable measurement of the intended construct and reinforcing the overall reliability of the test outcomes (George & Mallery, 2003).

After reliability testing, questionnaires were distributed to target respondents, and 450 responses were received. Confirmatory factor analysis (CFA) was then used to test convergence, accuracy, and validity. Model fit is calculated by overall testing of the given data to ensure the validity and reliability of the model. Finally, the researchers applied structural equation modeling (SEM) to examine the influence of variables.

3.3 Population and Sample Size

This study's participants are undergraduate students from three universities in Guangdong Province, China. The sample size for constructing the structural equation model aligns with Soper's (2006) recommendation of surveying a minimum of 425 participants. Following the data screening process, 450 questionnaires were utilized for the analysis in this study.

3. Sampling Technique

Three public universities in Guangdong province, South China Normal University, Shenzhen University, and the Guangdong University of Technology, were selected using non-probability and judgmental sampling methods. Then, the quota sampling method was adopted, and 450 undergraduates from the three universities were selected from 23,707 undergraduates. Among the three universities, 135 undergraduates from South China Normal University, 121 from Shenzhen University, and 194 undergraduates from Guangdong University of Technology were sampled, as shown in Table 1. The researchers then distributed the questionnaires online using a convenient sampling method.

Table 1: Sample Units and Sample Size

University name	Population Size	Proportional Sample Size
South China Normal University	7130	135
Shen Zhen University	6377	121
Guangdong University of Technology	10200	194
Total	**23707**	**450**

Source: Constructed by author

4. Results and Discussion

4.1 Demographic Information

The demographic target was 450 participants, summarized in Table 2. 53.1% of the respondents were male, and 46.9% were female. Regarding age groups, the grade group with the highest proportion in this study was juniors and above,

accounting for 52.5% of the respondents. Second- and first-year students accounted for 27.1% and 20.4% respectively. Regarding age group, the highest proportion is 21-23 years old, accounting for 51.8%, followed by 24-26 years old, accounting for 24.4%, and 18-20 years old, accounting for 23.8%. From the year when online teaching began to be used, 2020-2021 had the highest usage rate, accounting for 59.4%, followed by 2018-2019, accounting for 22.2%, and 2016-2017, accounting for 15.3%. Before 2016, this proportion was only 3.1%. Judging from the types of courses universities offer, online education accounts for 49.1%, traditional education accounts for 31.8%, and hybrid courses account for 19.1%.

Table 2: Demographic Profile

Demographic and General Data (N=450)		Frequency	Percentage
Gender	Male	239	53.1%
	Female	211	46.9%
Grade	Freshman	92	20.4%
	Sophomore	122	27.1%
	Junior year or over	236	52.5%
Age	18-20 years old	107	23.8%
	21-23 years old	233	51.8%
	24-26 years old	110	24.4%
Which year began to offer online learning	Pre2016	14	3.1%
	2016 to 2017	69	15.3%
	2018 to 2019	100	22.2%
	2020 to 2021	267	59.4%
Which type of courses does your institution offer?	Online education	221	49.1%
	Traditional courses	143	31.8%
	Hybrid courses	86	19.1%

4.2 Confirmatory Factor Analysis (CFA)

In this study, Confirmatory Factor Analysis (CFA) was employed to scrutinize the measurement model using Structural Equation Modeling (SEM). The results of CFA indicate the significance of all items within each variable, demonstrating their validity and distinctiveness. The factor loadings, which exceeded 0.50 and exhibited values lower than 0.05, further validate the goodness of fit (Hair et al., 2006). Moreover, the overall reliability (CR) surpasses the threshold of 0.7, and the extracted mean-variance (AVE) exceeds the threshold of 0.4, as recommended by Fornell and Larcker (1981). As depicted in Table 3, both the constructed reliability (CR) and the extracted mean-variance (AVE) are higher than the respective cutoff points of 0.7 and 0.5 (Fornell & Larcker, 1981), affirming the significance of all estimates.

Table 3: Confirmatory Factor Analysis Result, Composite Reliability (CR) and Average Variance Extracted (AVE)

Variables	Source of Questionnaire (Measurement Indicator)	No. of Item	Cronbach's Alpha	Factors Loading	CR	AVE
Learning Material (LM)	Draus et al. (2014)	3	0.795	0.717-0.812	0.811	0.589
Infrastructure Facilities (IF)	Gouda et al. (2013)	3	0.910	0.656-0.753	0.747	0.497
Academic Staff (AS)	Van (2012)	3	0.818	0.727-0.798	0.808	0.584
Degree Program (DP)	Allen and Dadgar (2012)	3	0.843	0.680-0.807	0.794	0.564
Perceived Usefulness (PU)	Abdullah et al. (2016)	3	0.751	0.697-0.852	0.806	0.583
Student Satisfaction (SS)	Cole et al. (2014)	3	0.932	0.680-0.774	0.768	0.525
Intention To Use (ITU)	Teo (2011)	3	0.885	0.749-0.786	0.809	0.585

Determine the square root of the extracted mean-variance and determine that all correlations are greater than the corresponding correlation values for that variable in Table 4. GFI, AGFI, NFI, CFI, TLI, and RMSEA are used as the index of the model fitting the CFA examination.

Table 4: Goodness of Fit for Measurement Model

Fit Index	Acceptable Criteria	Statistical Values
CMIN/DF	< 5.00 (Al-Mamary & Shamsuddin, 2015; Awang, 2012)	1.044
GFI	≥ 0.85 (Sica & Ghisi, 2007)	0.965
AGFI	≥ 0.80 (Sica & Ghisi, 2007)	0.952
NFI	≥ 0.80 (Wu & Wang, 2006)	0.953
CFI	≥ 0.80 (Bentler, 1990)	0.998
TLI	≥ 0.80 (Sharma et al., 2005)	0.997
RMSEA	< 0.08 (Pedroso et al., 2016)	0.01
Model Summary		**Acceptable Model Fit**

Remark: CMIN/DF = The ratio of the chi-square value to degree of freedom, GFI = goodness-of-fit index, AGFI = adjusted goodness-of-fit index, NFI = normalized fit index, CFI = comparative fit index, TLI = Tucker Lewis index, and RMSEA = root mean square error of approximation

Since the values in this study shown in Table 5 are greater than the acceptable values, the convergence and discriminant validity are verified. Therefore, convergence validity and discriminant validity are guaranteed. In addition, the results of these model measurements confirm the validity of the discriminant and the validity of the estimation of subsequent structural models.

Table 5: Discriminant Validity

	LM	IF	AS	DP	PU	SS	ITU
LM	**0.767**						
IF	0.488	**0.705**					
AS	0.376	0.490	**0.764**				
DP	0.414	0.505	0.346	**0.751**			
PU	0.436	0.349	0.344	0.297	**0.763**		
SS	0.446	0.435	0.428	0.267	0.449	**0.725**	
ITU	0.515	0.560	0.579	0.488	0.441	0.506	**0.765**

Note: The diagonally listed value is the AVE square roots of the variables
Source: Created by the author.

4.3 Structural Equation Model (SEM)

Hair et al. (2010) emphasized using structural equation modeling (SEM) to validate the proposed causal relationships among variables in the model, thereby integrating the measurement precision into the structural coefficients. The goodness-of-fit index of the structural equation model (SEM) is presented in Table 6. According to Greenspoon and Saklofske (1998), the model-fit measurement should entail a chi-square/degrees of freedom (CMIN/DF) ratio not exceeding 3, with GFI and CFI values above 0.8. The calculations were conducted using SPSS AMOS version 26, and adjustments were made accordingly. The fitting results of the indices were as follows: CMIN/DF = 3.412, GFI = 0.858, AGFI = 0.82, NFI = 0.833, CFI = 0.875, TLI = 0.855, RMSEA = 0.073. The acceptable values are outlined in Table 6.

Table 6: Goodness of Fit for Structural Model

Fit Index	Acceptable Criteria	Statistical Values
CMIN/ DF	< 5.00 (Al-Mamary & Shamsuddin, 2015; Awang, 2012)	3.412
GFI	≥ 0.85 (Sica & Ghisi, 2007)	0.858
AGFI	≥ 0.80 (Sica & Ghisi, 2007)	0.820
NFI	≥ 0.80 (Wu & Wang, 2006)	0.833
CFI	≥ 0.80 (Bentler, 1990)	0.875
TLI	≥ 0.80 (Sharma et al., 2005)	0.855
RMSEA	< 0.08 (Pedroso et al., 2016)	0.073
Model Summary		**Acceptable Model Fit**

Remark: CMIN/DF = The ratio of the chi-square value to degree of freedom, GFI = goodness-of-fit index, AGFI = adjusted goodness-of-fit index, NFI = normalized fit index, CFI = comparative fit index, TLI = Tucker Lewis index, and RMSEA = root mean square error of approximation

4.4 Research Hypothesis Testing Result

The research model calculates the significance of each variable by regression weight and R2 variance. The results in Table 7 assume that only H4 is unsupported. Student satisfaction had the greatest influence on usage intention (β = 0.479), and staff had the greatest influence on student satisfaction (β =0.288).

Table 7: Hypothesis Results of the Structural Equation Modeling

Hypothesis	(β)	t-value	Result
H1: LM→SS	0.270*	4.515	Supported
H2: IF→SS	0.226*	3.671	Supported
H3: AS→SS	0.288*	4.754	Supported
H4: DP→SS	0.042	0.746	Unsupported
H5: PU→SS	0.257*	4.26	Supported
H6: PU→ITU	0.209*	3.641	Supported
H7: SS→ITU	0.479*	6.787	Supported

Note: * p<0.05
Source: Created by the author

The result from Table 7 can be refined that:

H1 proves that learning material is one of the important factors affecting student satisfaction, and the standard coefficient value on the structural path is 0.270. In their research, Kaur and Bhalla (2018) also confirmed that learning materials impact students' satisfaction. In H2, the shadow of infrastructure on students' satisfaction is significant, and the standard coefficient value is 0.226. H3 assumes that teachers significantly impact student satisfaction, resulting in a standard coefficient value of 0.288, the second most significant value among the seven hypotheses. It also means that all aspects of teaching staff can improve student satisfaction. The hypothesis of H4 reflects that degree programs' satisfaction with undergraduate students' online learning is insignificant, and its standard coefficient value is only 0.042. The permanent validity of H5 also significantly impacts student satisfaction, and the standard coefficient value is 0.257 respectively. The permanent validity of H6 is assumed to be significant for the intended use, with a standardized coefficient value of 0.209. Finally, the standard coefficient value of the impact of student satisfaction on the intention to use is 0.479, the highest standard coefficient value among the seven hypotheses. It is proven that student satisfaction significantly impacts the intentional use of online learning.

5. Conclusion and Recommendation

5.1 Conclusion and Discussion

The focus of this study is to examine the significant impact of student satisfaction and usage intention on three public universities in Guangdong. This study uses hypotheses as a conceptual framework to explore the effects of learning materials, infrastructure, academic personnel, degree courses, and perceived usefulness on student satisfaction and usage intention. A survey questionnaire was developed in the study and distributed to undergraduate students from South China Normal University, Shenzhen University, and Guangdong University of Technology as target student samples. Data analysis will be used to explore

the factors affecting student satisfaction and usage intention among students in Guangdong. Confirmatory factor analysis (CFA) is beneficial for measuring and testing the effectiveness and reliability of conceptual models. To this end, structural equation modeling (SEM) is applied to analyze the factors influencing student satisfaction and usage intention.

The study describes its findings below. First, undergraduate students' satisfaction has the most significant impact on their intention to use online instruction. Kashive et al. (2020) mentioned the relationship between student satisfaction and intention to use. Higher student satisfaction can enhance students' intended use. Secondly, academic staff ranked second in the impact ratings on undergraduate satisfaction. Academic staff in online classrooms can satisfy students by clearly instructing students online and enhancing interaction with academics. Academic staff ensure the circulation of classroom content and student communication during online teaching. Third, learning materials significantly impact undergraduate student satisfaction in three public universities in Guangdong. Kaur and Bhalla (2018) studied that the correct use of learning materials can convey knowledge to students more effectively. In addition, in online courses, students need the assistance of learning materials to accept new knowledge better. Fourth, perceived usefulness also proves to impact student satisfaction positively. Students' perception of the usefulness of online courses can make students satisfied, so the degree to which students perceive the effectiveness of online learning is crucial (Shee & Wang, 2008). Fifth, infrastructure also has a relevant impact on undergraduate student satisfaction. Undergraduate students have just entered university and do not have a special understanding of university affairs, so they need infrastructure assistance to improve student satisfaction. The sixth is that Perceived usefulness has a positive impact on intended use. The better students use online learning, the higher the perceived usefulness and the higher the students' intention to use online courses. Perceived usefulness has a significant positive impact on online learning (Chiu et al., 2005). Finally, degree programs have little correlation with student satisfaction for undergraduate students. Most undergraduate students do not have a specific in-depth understanding of degree programs. They need time to find a degree program that interests them, so an efficient degree program will have less impact on undergraduates.

The study found that learning materials, infrastructure, teaching staff, and perceived effectiveness positively correlated with student satisfaction and intention. In contrast, the impact of degree courses on student satisfaction and intention was uncorrelated. In summary, the objectives of this study have been achieved. Learning materials, infrastructure facilities, academy staff, and perceived usefulness are the key factors affecting graduate students' satisfaction and usage intention in three public universities in Guangdong.

5.2 Recommendation

The researcher identified key factors of learning materials (LM), infrastructure facilities (IF), academe staff (AS), degree program (DP), perceived usefulness (PU) on student satisfaction (SS), and intended to use (ITU) on the three major higher education institutions in different regions of Guangdong.

For undergraduates from three public universities in Guangdong, the above-mentioned key factors positively impact student satisfaction and willingness to use online education, except that degree courses are unimportant and should be developed and promoted. In this study, academic staff was the strongest predictor of online education satisfaction and intention to use. Therefore, it is important to emphasize interactivity and practicality in online courses for academic staff. Suppose undergraduate students believe that the knowledge taught by professors in online courses can be conveyed to students through online courses and clearly express academic content. In that case, it can stimulate students' learning satisfaction and improve their academic performance. Students will gain a sense of satisfaction and a desire to learn, and then they intend to use online education.

For online education, having high student satisfaction and usage intentions should also ensure the availability of learning materials, infrastructure, and perceived usefulness. Learning materials and infrastructure and the perceived usefulness of learning should be better set up in online education to help students learn online courses more effectively and improve their satisfaction and willingness to accept online learning. As long as quality characteristics are ensured, the facilities they support should be advertised to students to increase student awareness and recognition. These can stimulate or increase satisfaction and willingness to use online learning during the online learning process.

This study explains in detail the factors influencing college students' satisfaction and intention to use online education. To identify variables for university personnel that influence college student's intention to use online education to apply to online courses.

5.3 Limitation and Further Study

This study has some limitations that need to be noted. First, this study only focuses on higher education and selected three universities in Guangdong Province to collect data, so the scope and sample size are limited. Second, the subject of this study is some of the factors that influence online education on student satisfaction and intention to use. Further research can be conducted on other factors

influencing online learning, such as student attitudes), permanent ease of use, etc. Exploring different influencing factors may lead to different findings and improve the generalization of the research model. Third, the number of respondents in the study was limited to students.

Further research might include teachers as respondents to understand their perceptions of satisfaction and intended use of online education. In future studies, researchers can use experimental methods to control for variables that may confound causal relationships. For example, a specific factor is used to observe the impact of this independent variable on the dependent variables' satisfaction and intention to use. Qualitative research could also be added to understand better undergraduate students' use of online courses for satisfaction and their intended use.

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