pISSN: 1906 - 6406 The Scholar: Human Sciences
eISSN: 2586 - 9388 The Scholar: Human Sciences
https://assumptionjournal.au.edu/index.php/Scholar

The Aspects of Postgraduate Students' Satisfaction and Intention to Use Online Higher Education from Public Universities in Guangdong, China

Chong Han*

Received: March 13, 2024. Revised: June 29, 2024. Accepted: Frebuary 18, 2025.

Abstract

Purpose: This study aims to investigate the students' satisfaction and willingness to attend online higher education at three universities in Guangdong Province. The conceptual framework proposes learning materials, infrastructure, academic staff, degree programs, perceived usefulness, student satisfaction, and willingness to use. **Research design, data, and methodology:** The researchers used a quantitative method (n=450) to distribute questionnaires to postgraduates at three universities in Guangdong Province. Non-probability sampling includes judgment sampling when selecting postgraduates from three universities, quota sampling when determining the scope, and convenience sampling when collecting online distribution surveys. Structural equation modeling (SEM) and confirmatory factor analysis (CFA) are used for data analysis, including model fitting and the reliability and validity of structures. **Results:** Learning material has, academic staff, degree program, and perceived usefulness significantly impact student satisfaction. Perceived usefulness and student satisfaction have a significant impact on student intention to use. Nevertheless, infrastructure facilities have no significant impact on student satisfaction. **Conclusions:** This study provides the senior management of colleges and universities with the tools to identify the variables that affect the willingness of college students to use online education so that it can be applied to online teaching.

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

JEL Classification Code: E44, F31, F37, G15

1. Introduction

During the COVID-19 pandemic, e-learning platforms played a key role in the mass adoption of e-learning in China (Liu et al., 2020). In the early days of the suspension, Chinese university students had to face the difficulty of "waiting at home to study." The Ministry of Education has taken urgent measures, including setting up more online platforms to help college students learn to quickly resolve the problem and ease public anxiety (Dhawan, 2020). As of April 3, 37 government-supported platforms and more than 110 social and academic platforms nationwide have actively provided online learning materials and services. To prevent servers from being overburdened, students must take separate classes on different platforms (Martin & Bolliger, 2018). China's more than 31.04 million college students can often meet their massive online learning needs through these platforms. More and more Chinese administrators and scholars are shifting their attention from whether students can learn to their satisfaction with the educational environment and their intention to use it (Liu et al., 2020).

In recent years, the Ministry of Education has rolled out a series of measures to create and strengthen online learning platforms in China, as serving students and ensuring their satisfaction is the primary goal of promoting e-education (Redmond et al., 2018). Before the COVID-19 epidemic,

1*Chong Han, Ph.D. Candidate InTechnology, Education and Management, Graduate School of Business and Advance Technology Management, Assumption University, Thailand. Email: 489325741@qq.com

few studies in China explored the factors influencing college students' satisfaction with online learning platforms (Chen et al., 2020). As a result, governments, institutions, and platform service providers may need more strategic recommendations to improve student satisfaction. Educators and administrators in China are also concerned that online education may exacerbate existing inequalities (Ayu, 2020).

Multiple studies have shown that e-learning is more effective than traditional learning. This teaching technique reduces barriers to education by removing time and geographical constraints (Demuyakor, 2020). Another advantage of e-learning is its flexibility. Students can access online courses anytime, anywhere, making them lifelong learners. Nevertheless, there are certain drawbacks to e-learning, such as lack of access and engagement and networking issues (Tiejun, 2021). Before COVID-19, e-learning was only one of Chinese schools most widely used teaching technologies. Like other countries, China supports rapidly adopting this innovative teaching method in school curricula. Until the pandemic is over, most higher education institutions are ready to move from traditional classrooms to virtual ones. However, information on the acceptability of e-learning needs to be improved in China. Therefore, this study aimed to identify the effects on higher education students' online learning well-being and their intention to use it.

2. Literature Review

2.1 Learning Material

Studying how students typically use learning materials can help us understand how they access online learning (Croxton, 2014). Several studies have reported their findings using descriptive statistics, with viewing learning materials (i.e., the number of course Outlines viewed and the number of online lectures viewed) being the most frequently accessed tool (Dziuban et al., 2015). Draus et al. (2014) found that students regularly watch learning materials, and the time they watch videos varies greatly. The study also used correlation and regression analysis to investigate the association between learning materials and academic achievement in online learning. The study's results found a good relationship between the total time spent looking at instructional materials and the number of logins and messages generated. Thus, this study put forwards a hypothesis:

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

2.2 Infrastructure Facilities

Some scholars link school infrastructure to student engagement. For example, Gouda et al. (2013) found that well-equipped schools are more operational and provide more student learning opportunities, leading to increased student engagement. School technology significantly impacts student engagement (George et al., 2014). Sujarwo et al. (2018) state that good technology integration in learning is closely linked to student engagement and is a key way to encourage student participation.

Academics have studied the impact of the quality of university utilities. Juneja and Sholihah (2019) state that having good infrastructure in colleges and universities can improve student attention and promote prosocial behavior, even in online education, thereby increasing student satisfaction. According to Shirokova et al. (2017), the provision of fully functional teaching equipment considerably benefits enrollment, indicating student engagement. The link is even stronger in remote efficiency. Kaplan (2015) found that good infrastructure can significantly improve students' concentration levels, attitudes, and enthusiasm for learning. 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) find that the competence of academic staff is influenced by a person's abilities, knowledge, experience, and skills, as well as a person's willingness and ability to reach their potential in adult teaching and to be accountable for their decisions in the educational process. This includes communication, learning skills development, social skills, problem-solving, and information and communication technologies. Academic staff will be more inclined to engage in activities that create and sustain specific habits that can lead directly to getting work done in a more conducive work environment. The competence of academic staff significantly impacts student satisfaction in the higher education sector. Buhari (2013) claimed that the degree of expertise of academic staff is necessary to maintain the effective and efficient functioning of the teaching and learning process. Van (2012) claims that "student satisfaction is defined as a form of obtaining a performance experience (or outcome) that meets one's expectations, such as the behavior and words of lecturers and staff, the knowledge of lecturers and staff in providing services, and procedures. The work status of the teaching staff also affects student 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 (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). Postgraduates 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, postgraduate 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 hypotheses:
H5: Perceived usefulness has a significant impact on student satisfaction.

H6: Perceived usefulness has significant impact on student intention to use.

2.6 Student Satisfaction

Cole et al. (2014) identified four major aspects that affect students' e-learning well-being: online facilities, degree program content, learning communication, and learner effectiveness. Because satisfaction with an educational product or service is based on interactions between teachers and students, satisfaction research produces a complete model. Guo et al. (2013) propose a way to define customer satisfaction that may help close the gap in the research. The main variables of students' satisfaction with e-learning include infrastructure (technology accessibility), teaching staff behavior, degree program setup, effectiveness of study courses, teachers' responsiveness during e-learning, and user-friendly interfaces (Dziuban et al., 2015). Kuo et al. (2013) proposed a method to define customer well-being, which may help narrow the gap in research. Thus, this study put forwards a hypothesis:
H7: Student satisfaction has a significant impact on student intention to use.

2.7 Intention to Use

Satisfaction is the main criterion to promote usage intention. Teo (2011) proposed that perceived effectiveness and ease of use can promote use intention. In addition, Saeed al-Maroof et al. (2020) mention that perceived utility and perceived ease of use are key variables for continuing to use something. Tussyadiah (2016) found that the ease of use of perception and the effectiveness of perception positively impacted the desire of receiving participants to match services. The ease and effectiveness of online software use favorably impact user satisfaction. Educational satisfaction has a favorable effect on positive intention (Payre et al., 2014). Jang and Kim (2020) show that it also positively affects the willingness to use online learning. These studies suggest a favorable link between satisfaction and intent to use.

3. Research Methods and Materials

3.1 Research Framework

The conceptual framework was developed by examining previous research frameworks. It is adapted from four theoretical models. Kaur and Bhalla (2018) studied the impact of learning material (LM) and infrastructure facility (IF) on student satisfaction (SS). Secondly, the research by Weerasinghe and Fernando (2018) verified the impact of

academic staff (AS) and degree programs (DP) on student satisfaction (SS). The third study conducted by Kashive et al. (2020) explores the impact of perceived usefulness (PU) on student satisfaction (SS), which in turn impacts intention to use (ITU). The last one is the impact of perceived usefulness (PU) on the intention to use (ITU) proposed (Bag et al., 2022). The conceptual framework of this study is shown in Figure 1.

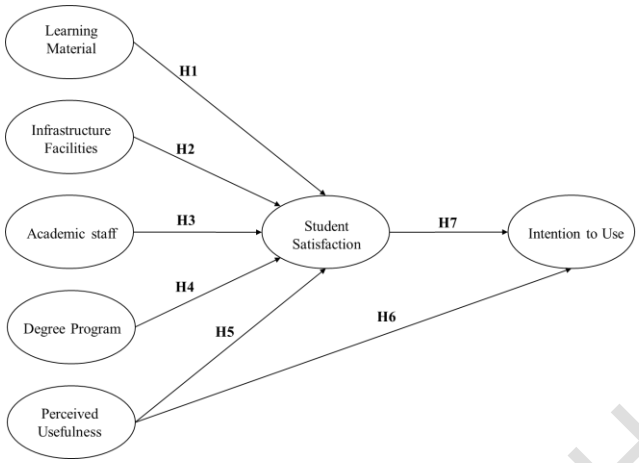

Figure 1: Conceptual Framework

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 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 non-probabilistic sampling to conduct quantitative methods and distributed questionnaires online to postgraduates in three universities in Guangdong Province. The survey was divided into three parts. First, three Guangdong Province of China higher education institutions were selected. This standard is used to ensure that the samples are representative of the whole geographical area of Guangdong. Second, a 5-point Likert scale was used to measure seven proposed variables, ranging from strongly disagree (1) to agree (5), to analyze all hypotheses strongly. Finally, the demographic issues are gender, age, educational background, and the beginning of online education.

Prior to data collection, a panel of three experts meticulously assessed the Index of Item-Objective Congruence (IOC) to ensure that each item accurately reflects its intended construct, thereby enhancing the validity of the assessment to a score exceeding 0.7. The pilot test necessitated the participation of 30 individuals to establish a robust scale. Consequently, the researcher handpicked 50 prospective students for the pilot study and conducted an analysis of internal consistency reliability using Cronbach's Alpha coefficient. The resulting Cronbach's Alpha score surpassed 0.7, indicating the dependable measurement of the desired construct and fortifying the overall reliability of the test outcomes (George & Mallery, 2003).

The collected data were analyzed using statistical software. Then, confirmatory factor analysis (CFA) is used to test for convergence, accuracy, and validation. The model fit degree is calculated by the whole test of the given data to ensure the validity and reliability of the model. Finally, the researchers applied structural equation modeling (SEM) to examine the effects of the variables.

3.3 Population and Sample Size

This paper targets postgraduates studying in universities in Guangdong Province, China. The sample size of this structural equation model suggests that Soper (2006) investigated at least 425 researchers. In the subsequent data screening process, 450 responses were used in this study.

3.4 Sampling Technique

Three public universities in Guangdong province, namely South China Normal University, Shenzhen University, and Guangdong University of Technology, were selected using non-probability and judgment sampling. Then, quota sampling was adopted, and 12,577 students from the three universities were used. Among the three universities, 157 postgraduates were sampled from South China Normal University, 160 from Shenzhen University, and 133 from Guangdong University of Technology, as shown in Table 1. The researchers then distributed questionnaires online using convenience sampling.

Table 1: Sample Units and Sample Size

University name	Population Size	Proportional Sample Size
South China Normal University	4389	157
Shen Zhen University	4478	160
Guangdong University of Technology	3710	133
Total	**12577**	**450**

Source: Constructed by author

4. Results and Discussion

4.1 Demographic Information

The profile of the demographic targets 450 participants, which is concluded in Table 2. Male respondents accounted for 52.9%, and female respondents accounted for 47.1%. Judging from the year when online teaching started to be used, the use rate was the highest from 2020 to 2021, accounting for 60.6% in total, followed by 2018 to 2019, accounting for 23.8%, and 2016 to 2017, accounting for 12.7%. Before 2016, it was only 2.9%. For the types of courses offered by universities, online education accounted for 46.9%, traditional education accounted for 30.2%, and Hybrid courses accounted for 22.9%.

Table 2: Demographic Profile

Demographic and General Data (N=450)		Frequency	Percentage
Gender	Male	238	52.9%
	Female	212	47.1%
Which year began to offer online learning	Pre2016	13	2.9%
	2016 to 2017	57	12.7%
	2018 to 2019	107	23.8%
	2020 to 2021	273	60.6%
Which type of courses does your institution offer?	Online education	211	46.9%
	Traditional courses	136	30.2%
	Hybrid courses	103	22.9%

4.2 Confirmatory Factor Analysis (CFA)

This study used CFA to analyze the measurement model through structural equation modeling (SEM). The CFA results show that all items in each variable are significant and have factor loads to demonstrate discriminative validity. The significance of factor loads and acceptable values for each item indicates goodness of fit (Hair et al., 2006). The factor load was higher than 0.50, and the p-value was lower than 0.05. In addition, as suggested by Fornell and Larcker (1981), the overall reliability (CR) is greater than the cutoff point of 0.7, and the extracted mean-variance (AVE) is higher than the cutoff point of 0.4. The construct reliability (CR) in Table 3 is greater than the cutoff point of 0.7, and the average variance extracted (AVE) is greater than the cutoff point of 0.5 (Fornell & Larcker, 1981), so all estimates are significant.

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	0.808	0.714-0.820	0.815	0.596
Infrastructure Facilities (IF)	Gouda et al. (2013)	3	0.775	0.784-0.828	0.807	0.582
Academic Staff (AS)	Van (2012)	3	0.704	0.717-0.747	0.775	0.534
Degree Program (DP)	Allen and Dadgar (2012)	3	0.812	0.711-0.797	0.804	0.578
Perceived Usefulness (PU)	Abdullah et al. (2016)	3	0.831	0.685-0.762	0.772	0.531
Student Satisfaction (SS)	Cole et al. (2014)	3	0.743	0.702-0.820	0.796	0.566
Intention To Use (ITU)	Teo (2011)	3	0.778	0.674-0.755	0.769	0.526

The square root of the extracted mean variance is determined 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 indicator CFA tests for model fit.

Table 4: Goodness of Fit for Measurement Model

Fit Index	Acceptable Criteria	Statistical Values
CMIN/DF	< 5.00 (Al-Mamary & Shamsuddin, 2015; Awang, 2012)	1.233
GFI	≥ 0.85 (Sica & Ghisi, 2007)	0.958
AGFI	≥ 0.80 (Sica & Ghisi, 2007)	0.942
NFI	≥ 0.80 (Wu & Wang, 2006)	0.941
CFI	≥ 0.80 (Bentler, 1990)	0.988
TLI	≥ 0.80 (Sharma et al., 2005)	0.985
RMSEA	< 0.08 (Pedroso et al., 2016)	0.023
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	**0.772**						
IF	0.270	**0.763**					
AS	0.413	0.160	**0.731**				
DP	0.235	0.179	0.235	**0.76**			
PU	0.346	0.199	0.322	0.256	**0.729**		

	LM	IF	AS	DP	PU	SS	ITU
SS	0.429	0.210	0.452	0.366	0.399	**0.753**	
ITU	0.461	0.336	0.499	0.430	0.443	0.512	**0.725**

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) mentioned that structural equation modeling (SEM) verifies the causal relationship between variables in the proposed model and incorporates the measurement inaccuracy of the structural coefficients. The goodness-of-fit index measurements of the structural equation model (SEM) are shown in Table 6. The model fit measurement should not exceed 3 for the Chi-square/degrees-of-freedom (CMIN/DF) ratio, and GFI and CFI should be higher than 0.8 (Greenspoon & Saklofske, 1998). The calculation in SEMs and adjusting the model by using SPSS AMOS version 26, the results of the fit index were presented as a good fit, which are CMIN/DF = 2.390, GFI = 0.904, AGFI = 0.878, NFI = 0.876, CFI = 0.923, TLI = 0.911 and RMSEA = 0.056, according to the acceptable values are mentioned 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)	2.390
GFI	≥ 0.85 (Sica & Ghisi, 2007)	0.904
AGFI	≥ 0.80 (Sica & Ghisi, 2007)	0.878
NFI	≥ 0.80 (Wu & Wang, 2006)	0.876
CFI	≥ 0.80 (Bentler, 1990)	0.923
TLI	≥ 0.80 (Sharma et al., 2005)	0.911
RMSEA	< 0.08 (Pedroso et al., 2016)	0.056
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 H2 is unsupported. Student satisfaction had the greatest impact on intention to use (β = 0.463), while academic staff satisfaction with students was β =0.317.

Table 7: Hypothesis Results of the Structural Equation Modeling

Hypothesis	(β)	t-value	Result
H1: LM→SS	0.271*	4.839	Supported
H2: IF→SS	0.088	1.632	Unsupported
H3: AS→SS	0.317*	5.414	Supported
H4: DP→SS	0.265*	4.735	Supported
H5: PU→SS	0.201*	3.544	Supported
H6: PU→ITU	0.247*	4.148	Supported
H7: SS→ITU	0.463*	7.174	Supported

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

The result from Table 7 can be refined that:

H1 proves that learning materials are an important influence on student satisfaction, revealing a standard coefficient value of 0.271 in the structural path. Kaur and Bhalla (2018) confirmed the impact of learning materials on student satisfaction. In terms of H2, it reflects that the impact of infrastructure on student satisfaction is insignificant, and its standard coefficient value is only 0.088. H3 assumes that teaching staff has a significant impact on student satisfaction, and the obtained standard coefficient value is 0.317, which is the second most significant value among the seven hypotheses. It also means aspects of teaching staff can contribute to higher student satisfaction. Degree courses and permanent validity in H4 and H5 significantly impact student satisfaction, and the obtained standard coefficient values are 0.265 and 0.201. Indicates that degree programs and permanent validity are important factors in student satisfaction. Permanent validity in H6 has a significant hypothesis on intended use, with its standardized coefficient value being 0.247. Finally, the standard coefficient value of the impact of student satisfaction on intention to use is 0.463, the highest standard coefficient value among the seven hypotheses. Demonstrated that student satisfaction has a significant impact on their intended use.

5. Conclusion and Recommendation

5. Conclusion and Discussion

This study examined the significant effects of student satisfaction and intention to use in three public universities in Guangdong. This study uses hypotheses as a conceptual framework to explore the impact of learning materials, infrastructure, academic staff, degree programs, and perceived usefulness on student satisfaction and intention to use. Questionnaires were developed and distributed to a target sample of students from three public universities in Guangdong. Data analysis explored factors influencing student satisfaction and intention to use among specific students within a geographical area. Confirmatory Factor Analysis (CFA) was used to measure and test the validity and reliability of the conceptual model. To this end, structural

equation modeling (SEM) was applied to analyze the influencing factors that affect student satisfaction and intention to use.

The study describes its findings as follows. First, satisfaction with graduate students had the most significant impact on the intention to use online instruction. Previous literature by Kashive et al. (2020) confirmed the relationship between student satisfaction and intention to use. Student satisfaction support can enhance students' intended use behavior. Second, support from academic staff ranked second in influence ratings of graduate student satisfaction. In an online teaching classroom environment, academic staff online guidance and enhanced interaction can make students feel satisfied and happy to learn. Academic staff can ensure the flow of classroom content and the exchange of students' ideas. Third, study materials have been shown to impact graduate student satisfaction significantly. Kaur and Bhalla (2018) support the results of the analysis that using learning materials correctly conveys knowledge to students more effectively. Learning materials work best when taught online. At the same time, in online teaching, students need the assistance of learning materials to accept new knowledge better. Fourth, degree programs have been shown to impact student satisfaction.

Farahmandian et al. (2013) found that academic courses have a statistically significant positive impact on student satisfaction levels. Even with online education, students want to use the Internet to learn more diverse knowledge about specific fields. The fifth and sixth are, respectively, that perceived usefulness positively impacts intention to use, and perceived usefulness positively impacts student satisfaction. Perceived usefulness has a significant positive impact on online intended use (Chiu et al., 2005)—the perceived usefulness of online instruction on students' intention to use online education. For perceived usefulness to student satisfaction, the extent to which students perceive effectiveness in online learning is crucial (Shee & Wang, 2008). The more effective students feel using online learning, the higher their student satisfaction will be. Finally, for graduate students, infrastructure showed little correlation with student satisfaction. Most graduate students can already study independently and solve learning problems, so efficient infrastructure will have less impact on them. It can be concluded that there is a positive relationship between the impact of learning materials, teaching staff, degree courses, and perceived effectiveness on student satisfaction and intention, while infrastructure exhibits an uncorrelated relationship. In summary, the study's objectives have been achieved, and learning material, academic staff, degree courses, and perceived usefulness are the key influencing factors on postgraduate student satisfaction and intention to use at three public universities in Guangdong.

5.2 Recommendation

The effects of learning materials (LM), infrastructure facilities (IF), academe staff (AS), degree program (DP), and perceived usefulness (PU) on student satisfaction (SS) and intended use (ITU) in three universities in Guangdong were studied.

In order to gain higher education's willingness to adopt online learning with student satisfaction and intent to use, the key factors mentioned above should all be developed and promoted, apart from the fact that infrastructure facilities are not important. In this study, academic staff was the strongest predictor of satisfaction with and intent to use online education. Therefore, it is important to emphasize online education's fun and practical aspects for academic staff. This means that if graduate students believe that the knowledge taught by the teaching staff in online courses can be conveyed to students in an image that stimulates their learning interest and improves their academic performance, they will get good satisfaction and have an intend to use online education.

Adopting student satisfaction and intent of use should ensure that learning materials, degree programs, and perceived usefulness are available. Therefore, learning materials and degree programs should be better set up in online education and the perceived usefulness of learning to help learners learn online courses more effectively and improve their satisfaction and intention to accept online learning. Once the quality characteristics are assured, other supported facilities should be advertised to students to increase student awareness and recognition. These can stimulate or increase satisfaction and intention to use online learning in the learning process.

This study explains the factors influencing college students' satisfaction and intention to use online education. It provides the senior management of colleges and universities with the tools to identify the variables that affect the willingness of college students to use online education so that it can be applied to online teaching.

5.3 Limitation and Further Study

The sample comprises postgraduate students from three well-known public universities in Guangdong, China. When looking at different school sizes or countries, it is possible to have different analysis results. Further research could examine other factors influencing student satisfaction and intended use in online learning, such as perceived ease of use, team learning, or attitudes. In addition, qualitative research can be added to understand better the impact of online education on college students' satisfaction and usage intentions.

References

Abdullah, N., A. Shonubi, O., Hashim, R., & Hamid, N. (2016). Recognition and Appreciation and its Psychological Effect on Job Satisfaction and Performance in a Malaysia IT Company: Systematic Review. *IOSR Journal of Humanities and Social Science, 21*(09), 47-55. https://doi.org/10.9790/0837-2109064755

Allen, D., & Dadgar, M. (2012). Does dual enrollment increase students' success in college? Evidence from a quasi-experimental analysis of dual enrollment in New York City. *New Directions for Higher Education, 2012*(158), 11-19.

Al-Mamary, Y. H., & Shamsuddin, A. (2015). Testing of The Technology Acceptance Model in Context of Yemen. *Mediterranean Journal of Social Sciences, 6*(4), 1-10. https://doi.org/10.5901/mjss.2015.v6n4s1p268

Awang, Z. (2012). *Structural equation modeling using AMOS graphic* (1st ed.). Penerbit Universiti Teknologi MARA.

Ayu, M. (2020). Online Learning: Leading e-Learning at Higher Education. *The Journal of English Literacy Education: The Teaching and Learning of English as a Foreign Language, 7*(1), 47-54. https://doi.org/10.36706/jele.v7i1.11515

Bag, S., Aich, P., & Islam, M. A. (2022). Behavioral intention of "digital natives" toward adapting the online education system in higher education. *Journal of Applied Research in Higher Education, 14*(1), 16-40. https://doi.org/10.1108/jarhe-08-2020-0278

Beauvais, A. M., Stewart, J. G., DeNisco, S., & Beauvais, J. E. (2014). Factors related to academic success among nursing students: A descriptive correlational research study. *Nurse education today, 34*(6), 918-923. https://doi.org/10.1016/j.nedt.2013.12.005

Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin, 107*(2), 238-246. https://doi.org/10.1037/0033-2909.107.2.238

Buhari, O. I. N. (2013). The correlates of stress, coping styles and psychiatric morbidity in the first year of medical education at a Nigerian University. *African Journal of Psychiatry, 16*(3), 206-215. https://doi.org/10.4314/ajpsy.v16i3.28

Chen, T., Peng, L., Yin, X., Rong, J., Yang, J., & Cong, G. (2020). Analysis of User Satisfaction with Online Education Platforms in China during the COVID-19 Pandemic. *Healthcare, 8*(3), 200. https://doi.org/10.3390/healthcare8030200

Chiu, C.-M., Hsu, M.-H., Sun, S.-Y., Lin, T.-C., & Sun, P.-C. (2005). Usability, quality, value, and e-learning continuance decisions. *Computers & Education, 45*(4), 399-416. https://doi.org/10.1016/j.compedu.2004.06.001

Cole, M. T., Shelley, D. J., & Swartz, L. B. (2014). Online instruction, e-learning, and student satisfaction: A three-year study. *The International Review of Research in Open and Distributed Learning, 15*(6), 1-10. https://doi.org/10.19173/irrodl.v15i6.1748

Croxton, R. A. (2014). The role of interactivity in student satisfaction and persistence in online learning. *Journal of Online Learning and Teaching, 10*(2), 314.

Demuyakor, J. (2020). Coronavirus (COVID-19) and online learning in higher institutions of education: A survey of the perceptions of Ghanaian international students in China. *Online Journal of Communication and Media Technologies, 10*(3), e202018. https://doi.org/10.29333/ojcmt/8286

Dhawan, S. (2020). Online Learning: A Panacea in the Time of COVID-19 Crisis. *Journal of Educational Technology Systems, 49*(1), 5-22. https://doi.org/10.1177/0047239520934018

Draus, P. J., Curran, M. J., & Trempus, M. S. (2014). The influence of instructor-generated video content on student satisfaction with and engagement in asynchronous online classes. *Journal of Online Learning and Teaching, 10*(2), 240-254.

Dziuban, C., Moskal, P., Thompson, J., Kramer, L., DeCantis, G., & Hermsdorfer, A. (2015). Student Satisfaction with Online Learning: Is It a Psychological Contract?. *Online Learning, 19*(2), 1-15. https://doi.org/10.24059/olj.v19i2.496

Farahmandian, S., Minavand, H., & Afshardost, M. (2013). Perceived service quality and student satisfaction in higher education. *Journal of Business and Management, 12(*4), 65-74. https://doi.org/10.9790/487x-1246574

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research, 18*(1), 39-50. https://doi.org/10.1177/002224378101800104

George, D., & Mallery, P. (2003). *SPSS for Windows Step by Step: A Simple Guide and Reference. 11.0 Update* (4th ed.). Allyn & Bacon.

George, P. P., Papachristou, N., Belisario, J. M., Wang, W., Wark, P. A., & Cotic, Z. (2014). Online eLearning for undergraduates in health professions: a systematic review of the impact on knowledge, skills, attitudes, and satisfaction. *Journal of Global Health, 4*(1), 010405. https://doi.org/10.7189/jogh.04.010406

Gouda, J., Chandra Das, K., Goli, S., & Maikho Apollo Pou, L. (2013). Government versus private primary schools in India: An assessment of physical infrastructure, schooling costs and performance. *International Journal of Sociology and Social Policy, 33*(11/12), 708-724. https://doi.org/10.1108/ijssp-12-2012-0105

Greenspoon, P. J., & Saklofske, D. H. (1998). Confirmatory factor analysis of the multidimensional students' life satisfaction scale. *Personality and Individual Differences, 25*(5), 965-971. https://doi.org/10.1016/s0191-8869(98)00115-9

Guo, J., Zhou, Y. J., Hillwig, M. L., Shen, Y., Yang, L., Wang, Y., Zhang, X., Liu, W., Peters, R. J., Chen, X., Zhao, Z. K., & Huang, L. (2013). CYP76AH1 catalyzes turnover of miltiradiene in tanshinones biosynthesis and enables heterologous production of ferruginol in yeasts. *Proceedings of the National Academy of Sciences, 110*(29), 12108-12113. https://doi.org/10.1073/pnas.1218061110

Hair, J. F., Anderson, R. E., Tatham, R. L., & Black, W. C. (2010). *Multivariate data analysis* (7th ed.). Prentice Hall.

Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2006). *Multivariate data analysis* (6th ed). Pearson Prentice Hall.

Hess, T. J., McNab, A. L., & Basoglu, K. A. (2014). Reliability generalization of perceived ease of use, perceived usefulness, and behavioral intentions. *Mis Quarterly, 38*(1), 1-28. https://doi.org/10.25300/misq/2014/38.1.01

Jang, H. Y., & Kim, H. J. (2020). A Meta-Analysis of the Cognitive, Affective, and Interpersonal Outcomes of Flipped Classrooms in Higher Education. *Education Sciences, 10*(4), 115. https://doi.org/10.3390/educsci10040115

Joo, Y. J., Lim, K. Y., & Kim, E. K. (2011). Online university students' satisfaction and persistence: Examining perceived level of presence, usefulness and ease of use as predictors in a structural model. *Computers & Education, 57*(2), 1654-1664. https://doi.org/10.1016/j.compedu.2011.02.008

Kaplan, D. H. (2015). Transportation sustainability on a university campus. *International Journal of Sustainability in Higher Education, 16*(2), 173-186. https://doi.org/10.1108/ijshe-03-2013-0023

Kashive, N., Powale, L., & Kashive, K. (2020). Understanding user perception toward artificial intelligence (AI) enabled e-learning. *The International Journal of Information and Learning Technology, 38*(1), 1-19.

Kaur, H., & Bhalla, G. S. (2018). Determinants of Effectiveness in Public Higher Education-Students' Viewpoint. *The International Journal of Educational Management, 32*(6), 1135-1155.

Kuo, Y.-C., Walker, A. E., Belland, B. R., & Schroder, K. E. E. (2013). A predictive study of student satisfaction in online education programs. *The International Review of Research in Open and Distributed Learning, 14*(1), 16. https://doi.org/10.19173/irrodl.v14i1.1338

Liaw, S.-S., & Huang, H.-M. (2013). Perceived satisfaction, perceived usefulness and interactive learning environments as predictors to self-regulation in e-learning environments. *Computers & Education, 60*(1), 14-24. https://doi.org/10.1016/j.compedu.2012.07.015

Liu, J., Zhu, Q., Fan, W., Makamure, J., Zheng, C., & Wang, J. (2020). Online mental health survey in a medical college in China during the COVID-19 outbreak. *Frontiers in psychiatry, 11,* 459.

Martin, F., & Bolliger, D. U. (2018). Engagement Matters: Student Perceptions on the Importance of Engagement Strategies in the Online Learning Environment. *Online Learning, 22*(1), 205-222. https://doi.org/10.24059/olj.v22i1.1092

Mushemeza, E. D. (2016). Opportunities and Challenges of Academic Staff in Higher Education in Africa. *International Journal of Higher Education, 5*(3), 236-246. https://doi.org/10.5430/ijhe.v5n3p236

Payre, W., Cestac, J., & Delhomme, P. (2014). Intention to use a fully automated car: Attitudes and a priori acceptability. *Transportation Research Part F: Traffic Psychology and Behavior, 27,* 252-263. https://doi.org/10.1016/j.trf.2014.04.009

Pedroso, R., Zanetello, L., Guimarães, L., Pettenon, M., Gonçalves, V., Scherer, J., Kessler, F., & Pechansky, F. (2016). Confirmatory factor analysis (CFA) of the Crack Use Relapse Scale (CURS). *Archives of Clinical Psychiatry (São Paulo), 43*(3), 37-40. https://doi.org/10.1590/0101-60830000000081

Pirohová, I., & Lenhardtová, M. (2020). Barriers to the education of adults with little or no education within the Slovak school system. *Education Sciences, 2*(1), 1-10

Racherla, P., & Friske, W. (2012). Perceived 'usefulness is of online consumer reviews: An exploratory investigation across three services categories. *Electronic Commerce Research and Applications, 11*(6), 548-559. https://doi.org/10.1016/j.elerap.2012.06.003

Redmond, P., Heffernan, A., Abawi, L., Brown, A., & Henderson, R. (2018). An Online Engagement Framework for Higher Education. *Online Learning, 22*(1), 183-204. https://doi.org/10.24059/olj.v22i1.1175

Saeed al-Maroof, R., Alhumaid, K., & Salloum, S. (2020). The Continuous Intention to Use E-Learning, from Two Different Perspectives. *Education Sciences, 11*(1), 6. https://doi.org/10.3390/educsci11010006

Sharma, G. P., Verma, R. C., & Pathare, P. (2005). Mathematical modeling of infrared radiation thin layer drying of onion slices. Journal of Food Engineering. *Journal of Food Engineering, 71*(3), 282-286. https://doi.org/10.1016/j.jfoodeng.2005.02.010

Shee, D. Y., & Wang, Y. S. (2008). Multi-criteria evaluation of the web-based e-learning system: A methodology based on learner satisfaction and its applications. *Computers & Education, 50*(3), 894-905. https://doi.org/10.1016/j.compedu.2006.09.005

Shirokova, G., Osiyevskyy, O., Morris, M. H., & Bogatyreva, K. (2017). Expertise, university infrastructure and approaches to new venture creation: assessing students who start businesses. *Entrepreneurship & Regional Development, 29*(9-10), 912-944. https://doi.org/10.1080/08985626.2017.1376516

Sholihah, N. K. (2019). Management of Education Facilities and Infrastructure. *3rd International Conference on Education Innovation (ICEI 2019)*, 183-186. https://doi.org/10.2991/icei-19.2019.24

Sica, C., & Ghisi, M. (2007). The Italian versions of the Beck Anxiety Inventory and the Beck Depression Inventory-II: Psychometric properties and discriminant power. In M.A. Lange (Ed.), *Leading - Edge Psychological Tests and Testing Research* (pp. 27-50). Nova.

Soper, D. (2006). *A-Priori Sample Size Calculator for Multiple Regression.* https://www.danielsoper.com/statcalc/calculator.aspx?id=1

Sujarwo, S., Noorhamdani, N., & Fathony, M. (2018). Relationship Between Infrastructure and Facilities for Students Preparedness to Deal with The Tsunami. JPPUMA: Jurnal Ilmu Pemerintahan Dan Sosial Politik UMA. *Journal of Governance and Political Social UMA, 6*(1), 96-105. https://doi.org/10.31289/jppuma.v6i1.1516

Teo, T. (2011). Factors influencing teachers' intention to use technology: Model development and test. *Computers & Education, 57*(4), 2432-2440. https://doi.org/10.1016/j.compedu.2011.06.008

Tessema, M. T., Ready, K., & Yu, W. (2012). Factors affecting college students' satisfaction with major curriculum: Evidence from nine years of data. *International Journal of Humanities and Social Science, 2*(2), 34-44.

Tiejun, Z. (2021). Implementation status and development thinking on cloud national examination in china under the situation of online anti-covid-19 epidemic. *Technological Forecasting and Social Change, 162*, 120322. https://doi.org/10.1016/j.techfore.2020.120322

Tovar, E. (2015). The role of faculty, counselors, and support programs on Latino/a community college students' success and intent to persist. *Community College Review, 43*(1), 46-71. https://doi.org/10.1177/0091552114553788

Tussyadiah, I. P. (2016). Factors of satisfaction and intention to use peer-to-peer accommodation. *International Journal of Hospitality Management, 55,* 70-80. https://doi.org/10.1016/j.ijhm.2016.03.005

Valerio, A., Parton, B., & Robb, A. (2014). *Entrepreneurship education and training programs around the world: Dimensions for success.* World Bank.

Van, W. B. (2012). *Research Design and Methods Part I* (1st ed.). The University of Western Cape.

Weerasinghe, I. M. S., & Fernando, R. L. S. (2018). Critical factors affecting students' satisfaction with higher education in Sri Lanka. *Quality Assurance in Education, 26*(1), 115-130. https://doi.org/10.1108/qae-04-2017-0014

Wu, J.-H., & Wang, Y.-M. (2006). Measuring KMS success: A respecification of the DeLone and McLean's model. *Information & Management, 43*(6), 728-739. https://doi.org/10.1016/j.im.2006.05.002