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Factors Affecting the Undergraduate Student's Satisfaction in Short-Term Online Courses: A Case Study of Vietnamese Pedagogical Students

Duc-Long Le [a], Thien-Vu Giang [a, *], Dieu-Khuon Ho [a], Hong-Ngan Pham-Huynh [a]

[a] Ho Chi Minh City University of Education, Vietnam

Abstract

Studies on short-term online courses in form of the massive open online course have become an e-learning trend in higher education institutions to transfer a sufficient amount of credits' knowledge in a short period. This article focused on exploring the factors that affected undergraduate students' satisfaction when participating in a short-term online course at a key pedagogical university in the South of Vietnam. This was a cross-sectional study with 1720 pedagogical students. The study aimed to explore and understand the factors affecting the satisfaction when studying online courses of pre-service teachers to prepare them with experience and knowledge for future online teaching. The results showed a positive correlation between perceived ease of use; perceived usefulness, information quality; system quality; instructors dimension; support service; subjective norm; perceived behavior control with students' satisfaction when participating in a short-term online course. This is the basis for research team to continue to develop and improve the quality of online courses and provide a theoretical framework on factors affecting learners' satisfaction when participating in a short-term online course for students in countries with higher education online education systems similar to Vietnam. In addition, this study expanded our understanding of the factors that influence the preparation of pre-service teachers to meet the requirements of digital transformation and international integration in e-learning educational trend from a developing country's perspective.

Keywords: higher education, massive open online course, pedagogical student, pre-service teachers, short-term online course.

1. Introduction

Since 2010, online training with short courses in the form of Massive Open Online Course (MOOC) is gradually becoming popular and constantly growing with familiar platforms such as

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* Corresponding author
E-mail addresses: thienvust0708@gmail.com (T.-V. Giang)

Topica, Khan Academy, Udemy, and Coursera. MOOCs are courses that carry the idea of open learning with information and communication technologies support in the form of distance learning/full e-Learning (Aparicio et al., 2019; Kiselev, Yakutenko, 2020). The open learning model of MOOCs makes knowledge-based content available online to everyone, and there is no limit to the number of participants. MOOCs provide opportunities for cooperation and information exchange among learners to acquire knowledge and discuss learning topics; and MOOCs also open a 'door of knowledge so that anyone around the world can self-study/research through Internet access (Le, 2014). The many benefits of MOOCs' flexibility through their open and massive nature of many online training programs, from undergraduate/graduate training to internal training, especially the exploitation of short-term online courses (SOC) – a course with a small number of credits/training duration, or with several study topics. Studies focused on SOCs in the form of MOOCs aims to reflect the concept of e-Learning design towards the trend of transporting enough amount of knowledge of a module or a subject in a suitable study period. One of the biggest limitations of MOOCs is the low completion rate (2~5 %) (Gütl et al., 2014). Therefore, improving the effectiveness and satisfaction of learners in SOCs is a problem that attracts a lot of attention to e-Learning studies (Wang et al., 2010).

SOCs were born to allow instructors to save training time, update training content more often, and control the amount of knowledge that learners receive through lessons. By the self-assessment system, learning materials are sent in different file formats compared to traditional teaching. This form is being applied quite popularly in many developed and developing countries such as the US, the UK, Korea, China, Japan, and India (Cole et al.,2021; Harasim, 2006; Kentnor, 2015; Mandasari, 2020; Rizvi et al., 2019). Especially in the context of the COVID-19 pandemic, countries in general and Vietnam, in particular, are taking tightening measures such as limiting direct contact, social distancing, and suspending school time. To prevent the spread of the disease, SOCs are considered an effective and necessary solution for learners to both ensure the learning progress but not too much pressure (short time), and ensure the safety of the students (Duc-Long et al., 2021).

In the context of the outbreak of COVID-19 in Vietnam from 2020, learning activities at higher education institutions must continuously switch between online and face-to-face, including a completely online learning phase (Dinh et al., 2021; Duc-Long et al., 2021; Nguyen, 2022). In particular, SOCs have been produced and tested by many universities in Vietnam to lay the foundational steps for the development of full-time online training in the future (Dinh et al., 2021; Duc-Long et al., 2021). From this context, besides the design and implementation of SOCs, it is necessary to pay attention to the feedback, perception, assessment, and satisfaction of learners for this form to improve the quality of training services and overcome existing limitations. In this respect, some scholars have also conducted research on which factors will affect learners' satisfaction with SOCs (Chiu et al., 2005; Masrom, 2007; Sun et al., 2008; Tarhini et al., 2013; Mohammadi, 2015; Granić, Marangunić, 2019; Pham et al., 2019; Duc-Long et al., 2021; Nguyen, 2022). These studies are done mostly in developed countries such as Taiwan, the USA, Korea, China, Spain, etc. The theories applied by the authors explained in several previous studies include Expectancy Disconfirmation Theory (EDT), Technology Acceptance Model (TAM), and Information Systems Success (ISS). In Vietnam, there are researchers focusing on the combined application of the ISS and TAM to consider learners' satisfaction based on their impressions from experiencing SOCs; but no studies has focused on pedagogical students – the future teachers who will teach online or SOCs. Therefore, this study will examine which factors affect pedagogical students' satisfaction when participating in SOCs based on the two models mentioned above. In addition, several proposals were also made to help higher education institutions in Vietnam improve and enhance the quality of e-Learning training services.

2. Theoretical framework

The Technology Acceptance Model (Marangunić, Granić, 2015) and the Information Systems Success (DeLone, McLean, 2003) are applied to frame the background of this study. Accordingly, perceived ease of use and perceived usefulness in the TAM are two important factors affecting the acceptance of using electronic information systems. These two factors are also used by many researchers to measure learner satisfaction with e-Learning such as Chiu et al. (2005), Masrom (2007), Sun et al. (2008), Wu et al. (2008), Tarhini et al. (2013), Marangunić and Granić, (2015),

Mohammadi (2015), Granić and Marangunić (2019). Along with that, the ISS model has shown different views on the evaluation of information systems. Specifically, six factors in the model are (DeLone, McLean, 2003): system quality, information quality, service quality, intention to use, user satisfaction, and subjective norm. Therefore, when considering the context of implementing e-Learning or SOCs in Vietnam along with inheriting previous studies of Pham et al. (2019), Dinh et al. (2021), Duc-Long et al. (2021), Nguyen (2022), this study proposes basic assumptions that learners' satisfaction will be affected by factors such as perceived ease of use; perceived usefulness, information quality; system quality; instructors dimension; support service; subjective norm; perceived behavior control.

Perceived ease of use

Perceived ease of use (PE) is the level to which an individual believes that using a particular system will not require too much effort (Marangunić, Granić, 2015). Previous mentioned researchers studied and mentioned the PE of an e-Learning system for students through how to use the system, how to control functions or operations on the system which have a positive impact on student satisfaction when studying online.

Perceived usefulness

Perceived usefulness (PU) is an individual's belief that using a particular system will enhance its effectiveness (Marangunić, Granić, 2015). Studies by Masrom (2007) and Granić & Marangunić (2019) mentioned the PU factor and the results obtained through the study are that user has the greatest impact on satisfaction. Tarhini et al. (2013) and Mohammadi (2015) also mentioned that usefulness has a positive influence on behavioral intention to use a web-based learning system. When users find SOCs to help them acquire desired knowledge and skills, they are more likely to use the system.

Information quality

Information quality (IQ) is concerned with the quality of output. IQ usually involves the timeliness, scope, relevance, and accuracy of the information generated by an information system (Delone, McLean, 2003). Pham et al. (2019) reported that IQ is a factor to evaluate the service quality of a system that affects user satisfaction through the quality of course materials and learning materials. The quality of information will assess whether the amount of knowledge that students have after each course is appropriate, timely, and meets the students' purposes, so it is closely related and meaningful between IQ and student satisfaction (Chiu et al., 2005; Sun et al., 2008).

System quality

This factor is related to whether there are bugs in the system, consistency of user interface, ease of use, response rate in interactive systems, quality of documentation, quality, and maintainability (DeLone, McLean, 2003). Masrom (2007) and Mohammadi (2015) indicate that system quality (SQ) has a positive effect on user satisfaction. Pham et al. (2019) argue that the quality of the e-Learning system is reflected in the universities' e-Learning websites. In addition, students also have a sensitivity to the technology tools used in the system during the learning process. The students give a sense of the appropriateness of the platform and its design, including its features such as content access, presentations, download speed, and videos (Martín-Rodríguez et al., 2015).

Instructors dimension

Instructors are the lecturers who communicate with students in the classroom, manage the course and students in the class; also compile lectures and exercises (Huynh, 2019). In addition, they are the facilitators and supporters of students in the learning process (Bui, 2016). Therefore, instructors must have both theoretical and practical knowledge, be attentive to students' interests, and foster ongoing student interaction (Pham et al., 2019). At the same time, instructors are considered the most important human resource to provide students with a whole new quality of education (Cheok, Wong, 2015). Studies by Masrom (2007) and Granić and Marangunić (2019) also mentioned that instructors have an impact on satisfaction.

Support service

Support services (SS) are a part of service quality. Service quality does not focus solely on the assessment of the teaching and learning process, but also on the evaluation of administrative services and other complementary services (Martínez-Argüelles, Batalla-Busquets, 2016). According to Pham et al. (2019), the quality of SOCs is assessed through the aspect of support services or administrative services and considers a factor that has a positive influence on student

satisfaction when studying online. Managing aspects of the SS is integral to ensuring student loyalty (Martínez-Argüelles, Batalla-Busquets, 2016).

Subjective norm

Subjective norm (SN) is an individual's perception that most important people think they should or should not do something (Ajzen, 2020). Masrom (2007) introduced this SN factor into the model to explain the influence of external factors from others when participating in e-Learning or SOCs. In addition, Tarhini et al. (2013) also mentioned the positive influence of SN on satisfaction.

Perceived behavior control

Perceived behavior control (PB) is considered in two aspects: the efficiency of the computer and the efficiency of the internet. It is the fact that an individual believes that he or she is capable of self-use and finds that the ease of use of computers and the internet will have a positive impact on satisfaction when using e-learning (Masrom, 2007; Granić, Marangunić, 2019). The efficiency of the computer is confirmed to be the determining factor in the acceptance and use of the system (Wu et al., 2010).

3. Methods

Study design

This is a quantitative cross-sectional survey study among Vietnamese undergraduate students which aims to explore the factors affecting satisfaction when taking SOCs at a key pedagogical university in Vietnam. Therefore, the research hypothesis is proposed that the proposed 8 factors (PE, PU, IQ, SQ, ID, SS, SN, PB) have a positive influence on student satisfaction when participating in a short-term online course.

Instrument

The hypothesis is tested through a primary data set with 300 valid observations collected by the convenience sampling method. The participants are pedagogical students at a key pedagogical university in the South of Vietnam who has been studying online through the SOCs for their learning and research. The official questionnaire includes 45 items inherited and adjusted from previous studies (see Table 1).

Table 1. Designing the questionnaire for research factors

Coding	Factors	Sources
PE	**Perceived Ease of Use**	
PE1	Learning how to use e-learning is easy for me	Masrom (2007), Granić & Marangunić (2019) , Wu et al. (2008)
PE2	I easily do what I want to do on the SOC system	Wu et al. (2008), Sun et al. (2008)
PE3	My interaction with the e-learning service is clear and understandable	Tarhini et al. (2013), Masrom (2007), Granić & Marangunić (2019)
PE4	I found the SOCs easy to use	Tarhini et al. (2013), Sun et al. (2008)
PE5	The course website allows me to find information easily	Pham et al. (2019)
PU	**Perceived Usefulness**	
PU1	Taking this course can improve my academic performance	Masrom (2007), Granić & Marangunić (2019), Tarhini et al. (2013)
PU2	I found this course useful for my studies	Masrom (2007), Granić & Marangunić (2019)
PU3	Taking the course allows me to finish my studies faster	Tarhini et al. (2013)
PU4	Taking a short online course saves my time	Mohammadi (2015)
PU5	Taking this course helps me save money	Mohammadi (2015)
IQ	**Information Quality**	
IQ1	The course provided me with confusing information	Masrom (2007), Granić & Marangunić (2019)

IQ2	Information from the course is always updated for my purposes	Masrom (2007), Granić & Marangunić (2019)
IQ3	The reliability of the output information from the course is high	Masrom (2007), Granić & Marangunić (2019)
IQ4	The course provided the information I needed promptly	Masrom (2007), Granić & Marangunić (2019)
IQ5	The course does not provide enough information for my purposes	Masrom (2007), Granić & Marangunić (2019)
IQ6	The course website provides me with valuable information	Pham et al. (2019), Dinh et al. (2021), Duc-Long et al. (2021), Nguyen (2022)
SQ	**System Quality**	
SQ1	The course allows me to take control of my learning activities	Wu et al. (2008)
SQ2	The course system has a quick response during peak times	Masrom (2007), Granić & Marangunić (2019)
SQ3	The arrangement of the information displayed on the interface of the e-learning system is clear	Masrom (2007), Granić & Marangunić (2019)
SQ4	The steps to complete my studies on the e-learning system are not simple	Masrom (2007), Granić & Marangunić (2019)
SQ5	I feel safe when providing confidential information to my university e-learning website	Pham et al. (2019), Dinh et al. (2021), Duc-Long et al. (2021), Nguyen (2022)
ID	**Instructors dimension**	
ID1	My course instructors are knowledgeable	Pham et al. (2019), Dinh et al. (2021), Duc-Long et al. (2021), Nguyen (2022)
ID2	My course instructors provide great lectures	Pham et al. (2019), Dinh et al. (2021), Duc-Long et al. (2021), Nguyen (2022)
ID3	My course instructors provide a learning environment that encourages interactive engagement	Pham et al. (2019), Dinh et al. (2021), Duc-Long et al. (2021), Nguyen (2022)
ID4	I receive timely assessments of assignments or tests for the course from my instructors	Sun et al. (2008)
ID5	Instructors are well prepared and have a teaching method suitable for learners	Masrom (2007), Granić & Marangunić (2019)
SS	**Support Service**	
SS1	My university has a first-time e-learning support service	Pham et al. (2019), Dinh et al. (2021), Duc-Long et al. (2021), Nguyen (2022)
SS2	The staff at the university will let me know exactly when my requests will be fulfilled.	Pham et al. (2019), Dinh et al. (2021), Duc-Long et al. (2021), Nguyen (2022)
SS3	The staff at the university gives me quick support service	Pham et al. (2019), Dinh et al. (2021), Duc-Long et al. (2021), Nguyen (2022)
SS4	The staff at the university always understands my specific needs	Pham et al. (2019), Dinh et al. (2021), Duc-Long et al. (2021), Nguyen (2022)
SS5	My university support service has convenient hours of operation	Pham et al. (2019), Dinh et al. (2021), Duc-Long et al. (2021), Nguyen (2022)

SN	Subjective Norm	
SN1	My friends think I should take a SOC	Masrom (2007), Granić & Marangunić (2019), Tarhini et al. (2013)
SN2	I have read the reports that taking a SOC is a good method of learning	Masrom (2007), Granić & Marangunić (2019)
SN3	My instructor thinks I should take a SOC	Masrom (2007), Granić & Marangunić (2019), Tarhini et al. (2013)
SN4	My family thinks I should take a SOC	Masrom (2007), Granić & Marangunić (2019)
PB	**Perceived Behavior Control**	
PB1	I can complete my learning activities in this course if I only have a study guide for reference	Masrom (2007), Granić & Marangunić (2019)
PB2	I can complete my learning activities in this course if I have never taken a similar course before	Masrom (2007), Granić & Marangunić (2019)
PB3	I can take and complete the course without anyone's help	Wu et al. (2008)
PB4	I feel confident when exchanging information with others in e-learning discussion forums	Masrom (2007), Granić & Marangunić (2019)
PB5	I feel confident downloading the materials from this course	Sun et al. (2008)
PB6	I feel confident when attaching files in the course	Masrom (2007), Granić & Marangunić (2019)
SAT	**Satisfaction**	
SAT1	I am satisfied with the achievement gained from the SOC	Masrom (2007), Granić & Marangunić (2019)
SAT2	My decision to take the course was a wise one	Masrom (2007), Granić & Marangunić (2019)
SAT3	I am satisfied with the experience when taking the course	Masrom (2007), Granić & Marangunić (2019)
SAT4	I am very satisfied with the SOC	Masrom (2007), Granić & Marangunić (2019)

Participants

Participants are pedagogical undergraduate students from 18 to 22 years old. The participants are from a key pedagogical university in Southern Vietnam. The authors choose a key pedagogical university because this university has training in pedagogical students and the output standard is that graduates can teach online, as well as be able to apply information technology in teaching. This is a critical requirement to innovate Vietnamese education, when the future teachers are capable enough to approach technology change, towards the development of smart education in Vietnam. In addition, the research team is also a lecturer in charge of developing a training program for pedagogical students of this university. In the context of the COVID-19 outbreak and teaching activities moving online, the team's implementation of this research is meant to make a positive contribution to the student's output standards, research, and national report because the pedagogy sector in Vietnam does not have to pay tuition fees when studying at university, to the development and improvement of SOCs for students; and ensuring the appropriateness of the team's ability to conduct research due to the limitation of research scope when social distancing takes place.

A letter was designed for students to introduce the project, explain the purpose of the survey, and get the university's permission to participate in the study. The survey process took place online by Google Form. Surveys were either sent to the participants during the online class time or

conducted directly by the co-authors. Participants were informed about the study via an information sheet, which was attached to every single questionnaire. The information sheet provided details about the study aims, the questionnaire content, confidentiality, choice of participation, and withdrawal, as well as the contact details of the research team. Completion of the questionnaire indicated implied consent on the part of the student. Only fully completed questionnaires were included in the final analysis.

After the necessary ethical preparations were obtained, the sampling process took place. We conduct sampling with a minimum sample size to use for EFA exploratory factor analysis according to Murtagh and Heck (2012) is n = 5*45 = 225 to ensure a minimum sample size with 45 observed variables. According to Chatterjee and Simonoff (2013), the minimum sample size for regression analysis with 8 independent variables is calculated as n = 50 + 8*8 = 114. In this combination, the required sample size is 300 in case of invalid answer sheets, they will be discarded after screening. Convenience sampling and snowball sampling methods were applied to collect primary data. The participants are those who have or are taking a SOC for the selected university. The content of the filtered questions is included in the questionnaire to identify the right participants to collect information. The survey took place entirely online from October 2021 to December 2021. The Google Form link is sent via email, thanks to the support and recommendation of some lecturers - currently the academic advisors of students participating in the courses, then we ask the students to introduce the next survey through the sharing form. The results obtained received many positive responses with 1800 answer sheets. After data collection was processed, there were 1720 valid and 80 invalid answer sheets.

Data analysis

After screening and obtaining the official data, the research team used descriptive statistics by SPSS software (version 22.0) to summarize the data and information of the sample such as gender, and academic year. Out of a total of 1720 participants, 1066 female students (62 %) and 654 male students (38 %) have been/are taking a SOC organized by the university. The participants included 520 freshmen (30.2 %), 385 sophomores (22.4 %), 412 seniors (24 %) and 403 juniors (23.4 %). Then, several analytical techniques were used include: testing the reliability of the scale by Cronbach's Alpha coefficient, exploratory factor analysis, and linear regression analysis to know whether there is a linear correlation with the dependent variable, whether the correlation is positive or negative and it is statistically significant in the population.

4. Results
Cronbach's Alpha reliability test

Except for the questions IQ1 and PB6 with a total correlation coefficient of less than 0.3, the analysis results show that the items in the same scale all have a total correlation coefficient greater than 0.3, achieving the desired results and the total Cronbach's Alpha coefficient is greater than 0.7 (see Table 2). Therefore, the independent and dependent scales used in this study are appropriate and creditable, these observed variables are used in the next exploratory factor analysis (EFA).

Table 2. Scale reliability test results

Scale	Items	Cronbach's Alpha
PE	5	0,764
PU	5	0,772
IQ	5	0,785
SQ	5	0,761
ID	5	0,733
SS	5	0,743
SN	4	0,717
PB	5	0,778
SAT	4	0,792

Exploratory factor analysis

We used EFA for the independent variables' scale, the final results showed that all statistical parameters were significant (see Table 3). Specifically, the coefficient KMO = 0.817 > 0.5 shows that the analysis is appropriate and statistically significant. p (Bartlett's test) < 0.05 shows that the items are correlated with each other. Factor loading coefficients are higher than 0.5 (except for IQ1 and PB6 which have been removed).

The Eigenvalue value is 1.231 > 1, so the 8 extracted factors have the best information summary meaning. At the same time, the total variance extracted of 70,969 indicates that 8 factors (PE, PU, IQ, SQ, ID, SS, SN, PB) explain 70.969 % of the variation of the data.

Table 3. Independent variable factor analysis results

Sources	Factors							
	X1	X2	X3	X4	X5	X6	X7	X8
SQ1	0,812							
SQ2	0,803							
SQ3	0,792							
SQ4	0,778							
SQ5	0,775							
PB2		0,806						
PB3		0,801						
PB1		0,795						
PB4		0,790						
PB5		0,781						
SN2			0,778					
SN3			0,773					
SN4			0,768					
SN1			0,759					
PE1				0,869				
PE2				0,858				
PE3				0,855				
PE4				0,834				
PE5				0,812				
IQ2					0,821			
IQ3					0,817			
IQ4					0,797			
IQ5					0,793			
IQ6					0,784			
PU3						0,759		
PU2						0,756		
PU5						0,749		
PU1						0,745		
PU4						0,743		
ID1							0,800	
ID2							0,791	
ID3							0,786	
ID4							0,780	
ID5							0,777	
SS1								0,811
SS2								0,807
SS3								0,799
SS4								0,793
SS5								0,767
KMO								0,817
Barlett's Test of								0.002

Sphericity								
Eigenvalues	12.884	5.164	3.774	2.711	1.623	1.586	1.472	1.231
Explanatory level of the factor	11.395	9.693	9.018	8.764	8.755	7.981	7.835	7.528
Cumulative level of explanatory	11.395	21.088	30.106	38.870	47.625	55.606	63.441	70.969

The questionnaire items of the dependent variable after being tested for the reliability of the scale by Cronbach's Alpha coefficient were also carried out factor analysis with the results showing that: Barlett's test with p < 0.05 shows that the items in the observed variable are correlated with each other. KMO coefficient > 0.5 shows that factor analysis is suitable for data. The extracted variance value = 79.237 and all questions have factor loading coefficients higher than 0.5. Thus, the 'Satisfaction' scale achieves a convergent value.

Table 4. Dependent variable factor analysis results

Source	Loading factor coefficient
SAT3	0,793
SAT4	0,791
SAT2	0,786
SAT1	0,777
KMO	0,782
Bartlett's Test of Sphericity	0,000
Eigenvalues	3,232
Level of explanation	79.237%

Linear regression analysis

In Table 5, all 8 factors have p < 0.05, so there is a correlation with satisfaction when the reliability is 95 %. Adjusted R^2 is 0.667, which means that 66.7 % of the change in satisfaction is explained by 8 independent factors in the research model, the remaining 33.3 % is due to the effects of other factors. The F test used in the analysis of variance (ANOVA) of the regression analysis reached p < 0.05, which indicates that the theoretical model is consistent with the actual data.

Table 5. Model test results of factors affecting the students' satisfaction when participating in a short-term online course

Factors	Beta	p	VIF
SQ	0,124	0,000	1,876
PB	0,298	0,002	1,923
SN	0,233	0,001	1,765
PE	0,267	0,023	1,787
IQ	0,156	0,000	1,656
PU	0,345	0,011	1,864
ID	0,104	0,004	1,576
SS	0,182	0,012	1,249
R^2			0,783
Adjusted R^2			0,773
F (p)			0,001

Based on the regression equation, shows that the regression coefficients are all higher than 0 so it is concluded that all independent factors included in the analysis have a positive impact on the dependent variable (SAT). Independent factors include PE, PU, SQ, PB, SN, IQ, ID, SS has a positive and significant impact on the students' satisfaction. From here, we give the regression equation predicting the satisfaction of pedagogical students when taking a SOC as:

$$SAT = 0.124SQ + 0,298PB + 0,233SN + 0,267PE + 0,156IQ + 0,345PU + 0,104ID + 0,182SS$$

5. Discussion

To discover the factors affecting satisfaction when participating in a SOC of pedagogy students at a key pedagogical university in Vietnam, we discovered the positive impact of 8 factors on student satisfaction. These are important findings to improve the experience and quality of teacher training in the future so that they can both teach online and inspire students to learn online and self-improve regularly through SOC. Based on the results of the regression analysis, we make the following discussions:

The PU factor has the greatest influence among the eight factors. This is consistent with previous research showing that perceived usefulness is more important than perceived ease of use when considered in the context of online learning. Specifically, users are interested in how an online learning system provides information and how effective it is (Masrom, 2007; Granić, Marangunić, 2019; Sun et al., 2008). This result also reflects that pedagogical students are aware of the importance of fully experiencing these online courses to improve their knowledge and skills. This is a big change in the perception of pedagogical students in the context that many Vietnamese lecturers and teachers are currently facing many difficulties in their competence to apply information technology in teaching (Dinh et al., 2021; Nguyen, 2022), as well as barriers to traditional teaching perception, which are still quite heavy in Vietnamese education (Duc-Long et al., 2021). This finding proves that Vietnamese pedagogical students in the new era have prepared themselves for the digitalization process of education.

The second influential factor after PU is PB. This result is also supported by studies by Masrom (2007), Granić and Marangunić (2019), Sun et al. (2008), and Wu et al. (2008) when there is a positive correlation to satisfaction. When a student attends a SOC, there will be worries about interacting with computers and online learning websites/platforms. The higher the anxiety, the more students cannot process information or requests well when using it, so the fact that students are aware of their behavioral abilities or confidently exchange information, will give students a more positive attitude towards the online learning system (Granić, Marangunić, 2019). Compared with the study of Duc-Long et al. (2021) when learning about the online-learning perception of pedagogical students, we found that there is a similarity when students are fully informed as well as guided on how to participate. Effective course participation and lecturers who know how to take care of students' mental health during the learning process will increase their satisfaction, especially when the students take part in the courses during the COVID-19 pandemic outbreak.

Next, the PE factor had the third strongest and most significant impact on students' satisfaction. From a practical perspective related to online learning, the easy access, ease of use by students of the system, and ease of finding information will stimulate and bring positive emotions, thereby encouraging learners to be more interested in taking the course. This result was also verified in the study of Masrom (2007). In particular, the study of Tarhini et al. (2013) shows that PE has the strongest influence on satisfaction. Ease of use will help users focus on information more effectively creating high efficiency. However, the results on the correlation between subjective normative factors and satisfaction are inconsistent compared with the study of Granić and Marangunić (2019). We found that the influence of family, friends, relatives, and mentors is really meaningful for strengthening trust, especially seeing the benefits from technology leading to the use of images in the context of the complicated COVID-19 pandemic in Vietnam. This finding reinforces the view that social relationships are a powerful mental resource that influences pedagogical students' perceptions of online learning. If these resources are perceived to be limited in terms of online learning, they will negatively affect their satisfaction with the course. This is an important consideration for online education program designers when it comes to emphasizing and incorporating social media measures of online learning to improve user experience.

The ID factor is assessed as influencing pedagogical student satisfaction. For the traditional form of learning, most of the interaction between the instructors and the learners is mainly face-to-face communication, while for the online learning form, this communication is indirect through the virtual environment by using tools and electronic equipment connected to the internet. This interaction is somewhat limited if the connection is unstable or encounters unexpected problems when connecting. Therefore, in addition to good professional knowledge, instructors play an important role in encouraging the interactive participation and active learning of learners through teaching methods, lesson organization, exercises, and tests (Pham et al., 2019; Nguyen, 2022). Studies on student satisfaction when participating in SOCs, or online classes in the context of the

COVID-19 outbreak in Vietnam, confirm the importance of lecturers to a positive classroom atmosphere (Dinh et al., 2021; Nguyen, 2022). If the lecturer effectively applies online teaching tools or has an active learner-centered online teaching method, the student's excitement, expectation, and satisfaction with that course will increase significantly.

In addition, the SS factor is also assessed to have a positive correlation with pedagogical students' satisfaction. In the process of using the online learning system, learners will inevitably encounter problems that they cannot solve themselves. This requires timely support from the administrator. Meeting the needs of course selection, security, troubleshooting or administrative procedures quickly will increase student satisfaction with the online learning system. This result again supports the view of Pham et al. (2019). Once students are supported quickly and promptly in the process of using, it will create trust and satisfaction when the benefits of students are all concerned by the university. IQ and SQ factors are two important factors. Learners themselves not only pay attention to what information the learning system provides, whether that information is clear, understandable, and relevant, but also pay special attention to the ability to respond quickly in the learning process during peak times, the arrangement of the information displayed and information security issues. Online learning is based on electronic devices and media with network connection, it is indispensable for the system features, and a service system is a place for learners to study and complete the assigned exercises. SQ is all worthy of attention. Information technology develops strongly, and the requirements from users are increasing, so the SQ is more and more concerned to improve user needs. This is completely consistent and has also been supported in several studies by Pham et al. (2019), Mohammadi (2015), and Masrom (2007).

6. Conclusion

This study results have discovered and tested the relationship between the factors affecting the satisfaction of pedagogical students when participating in SOCs. Accordingly, there is a positive correlation between PE, PU, SQ, PB, SN, IQ, ID, and SS with students' satisfaction. This result allows us to conclude about the acceptance of the proposed research hypothesis. This result also shows the initial psychological preparation of pedagogical students for online teaching, they are ready to experience these courses to form their knowledge, skills, and experience for their future teaching professionals. In addition, our findings confirm that the SOCs applied in the undergraduate credit training system of the key pedagogical university selected in this study have initially met the requirements of learners' satisfaction. This is the basis for the research team to continue to adjust and improve the quality of the online course from the system to the content, and the teaching scenario towards the satisfaction and happiness of the learners in the future. For developing countries, or with higher education systems (mainly pedagogical universities) similar to Vietnam, these results provide a theoretical and empirical framework for SOCs and factors affecting learners' satisfaction when participating in SOCs.

7. Recommendation

After combining theory and data analysis results, the authors have suggestions on management and quality improvement to help educational institutions that have been implementing SOC to improve the service quality and student satisfaction as follows:

Firstly, educational institutions need to have documents and videos on how to access, manipulate and use the functions in the service system before users start the course. In addition, the university needs to pay attention to reducing the complexity of the system when users interact, such as: arranging the displayed information reasonably and easily; reducing the display of unnecessary images in the system; simplifying assignment submission; looking up; searching information. The information displayed on e-learning systems or websites/platforms should be accurate and easily accessible.

Secondly, educational institutions need to promptly respond to requests for information, course selection, system failure issues, logins, class access, and other administrative procedures before, during, and after the learning process through the form of online learning quickly, accurately, and flexibly. In addition to general guidance documents and common troubleshooting notes, training units also need to maintain support throughout to avoid students having difficult problems that cannot be solved.

Thirdly, educational institutions need to ensure fast and accurate information through the system's notification feature sent via email and SMS to learners. Develop and regularly update the e-learning system to ensure its relevance to the context as well as innovation. At the same time, this helps learners to be able to access it anytime, anywhere, increasing the initiative in the teaching and learning process. In online lectures, it is recommended to record the lecture so that after the lesson, learners can listen again by accessing the authorized and decentralized system in case the learners do not or do not understand all the information due to problems of line speed, audio signal and some unexpected arising from the outside environment.

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