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FACTORS INFLUENCING STUDENT SATISFACTION OF ONLINE LEARNING WITHIN A VIETNAMESE UNIVERSITY CONTEXT DURING THE COVID-19 PANDEMIC

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Abstract – *Covid-19 created an unprecedented and severe crisis in Ho Chi Minh City. One of the more serious consequences of the Covid-19 pandemic has been social distancing. For the education system, the pandemic has directly affected students' learning processes. Students have to study online at the begining of the new school year. This study aimed to investigate and clarify the impact of factors affecting the satisfaction of university students in Ho Chi Minh City in the online learning process. A total of 999 university students participated in a student satisfaction survey. The survey results show that most of students participating in the survey are satisfied with their online learning process. Many factors had a positive influence on students' satisfaction in online learning, in which learning conferencing software had the greatest influence. Another finding was that there is a huge difference in students' responses to learning conferencing software. The study determined that the experience of using learning conferencing software influences student satisfaction, and it evaluated which learning conferencing software is the most optimal. Students satisfaction also varied depending on the number of academic years which the respondents had previously completed. This study's findings are valuable for higher education administrators who want to improve student satisfaction with online learning as it makes suggestions and recommendations to improve the quality of online learning and student satisfaction in Vietnam.*

Keywords: Covid-19 pandemic, learning quality, managerial implications, online learning, student satisfaction.

I. INTRODUCTION

Although the Covid-19 pandemic has been temporarily controlled in some countries, the emergence of the variant Omicron has threatened the health and safety of many countries like Vietnam [1]. Due to anxiety about the new variant, many Asian-Pacific countries delayed lifting travel restrictions and allowing international tourists [2], and many countries have placed strict restrictions to stop the spread of Omicron [3].

In Vietnam, the fourth outbreak of Covid-19 has had enormous impacts on the socio-economy. During the complicated pandemic, tertiary schools in Ho Chi Minh City have had to gradually switch to online learning to ensure the safety of learners, lecturers and staff. Online learning has been extended from the beginning of the school year 2021 to 2022, which requires universities to introduce new regulations and adjust their examination plans to adapt to the current situation [4, 5]. Switching to online learning has created chances for students and lecturers to gain new experiences, such as (1) flexible teaching and learning processes to meet learners' requirements, (2) new and creative learning methods, (3) new opportunities for lifelong learning, and (4) new ways to digitize school management and administration processes [6].

Online learning helps students not only maintain their learning processes [7] but also discover new knowledge of science and technology thanks to technological achievements in education like smart education [8, 9]. However, students also encounter difficulties with online learning such as their learning conditions at home. Such difficulties raise many questions for teachers like: 1) Are students equipped with enough learning

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devices? 2) Is their study space quiet? 3) Is their Internet connection stable? 4) Are learning platforms easy to use and to install? 5) Are the platforms compatible with devices students are using? And 6) Are students' learning devices used fully functional and configured properly? In addition to students' learning conditions at home, other factors may affect learning when students study online like their ability to use technology or access to the Internet [10–12]. These factors directly impact students' academic results and satisfaction with the school's teaching quality. This research was therefore conducted to assess student satisfaction with factors influencing their online learning. The study aimed to measure the most dominant factors leading to student satisfaction with teaching quality and determine the types of learning methods students want to maintain after the new normal brought about during the Covid pandemic.

II. LITERATURE REVIEW

A. Definition of e-Learning

Online learning (e-Learning) has long been a popular learning method in developed countries. It is a term used to describe education students access primarily via the Internet, meaning it does not include any physical learning materials issued to students or direct contact from teachers. Online learning generally uses e-Learning media distributed through course websites as the primary medium for students to interact and learn [13]. E-Learning is quite a broad field and consists of many perspectives, and there are different definitions of e-Learning. However, the definitions have some common characteristics, including the transmission of the learning content, teaching on computers, learning on technology devices, the use of advanced technologies in teaching, and creating a virtual environment for lecturers and students to learn and interact with others [14–16].

B. The roles of online learning to students

E-Learning has created an active learning environment for students to control their learning process. Learners can learn at their own pace, decide the most suitable learning methods, receive timely feedback on learning activities, and learn anywhere they can find an Internet connection. It helps to reduce the learning time of learners, give them more time to focus on their learning, and improve their academic results. According to a study by Picciano, Dziuban and Graham in 2014 at Central Florida University where online learning has long been used, the school offered eight online subjects for 125 students in 1997 but increased to 503 online subjects with 13,600 students by 2014. When comparing online to traditional face-to-face learning, the university found that student's academic results were higher than before, and the facility costs have been significantly reduced [17].

According to a study in 2005 by Angeliki, Asimina and Eleni, e-Learning had flourished dramatically. Even at that time, it was considered to be a training method for the future for several reasons. First, learners can learn anywhere and anytime while communicating synchronously and asynchronously with others in their class. Second, in general, e-Learning platforms are not too complicated. As long as users have an Internet-connected device, they can use e-Learning platforms comfortably. And third, depending on how it is deployed, e-Learning can be highly interactive with the addition of multimedia, allowing learners to exchange information more easily and access learning content tailoring to their abilities and interests [18]. In addition, with the replayability of learning content and multimedia, e-Learning supports other learning functions like student engagement and memory. Brown and Voltz have also listed three factors contributing to the effectiveness of online learning, including the quality of learning content, experiential activities and feedback [19]. Based on these features, online administrator, curriculum designers and teachers must build online learning platforms and content that can meet students' and teachers' learning and work needs and bring satisfaction to users [20].

C. Online learning during Covid-19

In the complicated context of the Covid-19 pandemic, online learning has been an effective method for students to maintain their learning progress, and it has shown to bring many advantages to education. There are many mediums

used to create virtual classrooms in cyberspace such as Google Classroom, Class-in, Edmodo, or WhatsApp and other platforms help people interact with each other through live videos, such as Zoom, Google Meeting, Microsoft Teams [21–23]. The popularity of e-Learning platforms depends on their functions and their ease of use. Universities usually prioritize platforms that are easy to use, install, and have no technical errors [24, 25].

In addition to the primary function of helping students maintain their learning and improve understanding, each platform offered by different publishers should provide various functionalities. It compared the popularity and ease of use of these e-Learning products [26, 27]. Pei and Wu's study [28] compared the learning effect of online versus traditional learning for medical education. The results show no evidence demonstrating that the traditional learning method is better than the online learning method, and compared with lecture-based teaching and learning, online learning can have more advantages related to accessibility, pace of learning and memory retention. For examples of how online learning can be more effective, a study by Baber [29] pointed out several factors that impacted Indian and Korean students' satisfaction and academic results during online learning, such as the quantity and/or quality of in-class interaction, student learning motivation, instructor's knowledge, and structures of lectures.

D. Student satisfaction when participating in online learning

E-Learning is a learning method based on using information technology platforms. It creates a virtual space where lecturers and students can have mutual interactions. Experiences on this platform directly affect users' satisfaction [30]. While many factors affect the quality of online learning, the online learning platform is the most significant. In 2020, Hai et al. [31] constructed a theoretical framework of online meeting platforms to assess students' attitudes and awareness of online learning. Trung [32] also gave a general introduction to Learning Management Systems (LMS) and demonstrated their popularity in the world, their deployment in Vietnam, and their future growth trends. Nghia et al. studied assessments of lecturers and students of the Traditional Medicine Faculty at the University of Medicine and Pharmacy in Ho Chi Minh City. The study discussed LMS quality and the effectiveness of online learning in the context of Covid [33]. In addition, studies by Malik & Mubeen, Singh, Rylander & Mims, Eggermont et al., Irawan, Dwisona & Lestari and Pontoh, Sadeli & Fadli have indicated the importance of online learning in maintaining the learning process, acquiring knowledge and protecting the health of students and staff during the pandemic [34–38]. Additionally, other studies by Jamalpur, Chythanya & Kumar, Bahasoan, Ayuandiani, Mukhram & Rahmat have identified weaknesses of online learning such as how the inapplicable platforms and technologies, poor users' technology skills, and poor concentration can negatively impact students' academic results [39, 40].

III. RESEARCH METHODS

A. Developing a quantitative survey questionnaire

This research used a quantitative approach to measure students' satisfaction with online teaching quality within the Engineering and Technology program at Nguyen Tat Thanh University. The study gathered data through a questionnaire using the Google Forms platform. The questionnaire was designed using Likert scales with five levels from (1) strongly dissatisfied to (5) strongly satisfied. Influence factors included several variables: learning conditions at home (coded as CON) which was measured using four questionnaire items, as well as learning conferencing software (SOF), learning devices used (DEV), and satisfaction with online learning process (SAT), each of which were measured using six items. In addition, other questions were designed to statistaclly measure students' experience with online learning platforms and describe commonly used online learning conferencing software in universities.

B. Data collection

The survey collected data from 999 respondents (238 males and 761 females) majoring

in Engineering and Technology at Nguyen Tat Thanh University by standard sampling method through an online questionnaire. Of 999 respondents, females accounted for 76.2% of the respondents. The respondents who took part in the survey were first-year to fourth-year students from 6 faculties including 1) Mechatronics, 2) Electrical and Electronic Engineering Technology, 3) Chemical Engineering Technology, 4) Automotive Engineering Technology, 5) Biological Engineering, and 6) Food Technology. Freshmen account for the highest response rate with 556 people (55.7%), followed by sophomores (29.3%), juniors (12.2%), and seniors (2.8%).

C. Data processing

Survey data was collected, encrypted, and analyzed using descriptive statistics, one-way ANOVA, verification of the scale's reliability through Cronbach's alpha coefficient, exploratory factor analysis (EFA), Pearson correlation test, and VIF index to detect the multicollinearity among variables. Lastly, a linear regression equation was used to examine whether variables have a positive or negative association and the most influential factors. The measurement of factors affecting the satisfaction of students of Nguyen Tat Thanh University in the online learning process was made based on the following linear regression equation:

$$SAT = \beta_0 + \beta_1 DEV + \beta_2 SOF + \beta_3 CON + \varepsilon$$

In which SAT is the dependent variable corresponding to the student's satisfaction with the online learning process, DEV is the learning device used, SOF is the learning conferencing software and CON is the learning conditions at home. In designing the questionnaire, the study also introduced two variables that act as control factors: D1 representing no difference between online and offline learning and D2 representing students' preference to study online over offline.

D. Research model

This research constructed a proposed model based on Davis' technology acceptance model (TAM) published in 1986 to assess learners' satisfaction depending on their feelings about online learning [41]. According to Davis, in the technology acceptance model, an individual's attitude is not the sole factor determining whether users use a system or not. It also depends on the impact of the system on users' performance. Therefore, even if an employee disagrees with an information system, they are highly likely to use it because they recognize that the system would improve productivity, thereby creating work efficacy. Additionally, the TAM model's ease of use and usefulness are two crucial factors affecting their acceptance of using an e-information system or important evaluation index to student satisfaction when learning online. Based on Davis' model and the research of other authors like Hai, Trung), Roman, Pei, Simamora, Suryaman et al.and Pham et al., this study proposed three factors influencing students' online learning satisfaction, including learning conditions at home (CON), learning conferencing software (SOF), and learning devices used (DEV) [12, 28, 31, 32, 42–44]. The research hypothesis proposed by the study was therefore:

- H1: The quality of learning conditions at home is positively associated with student satisfaction with online learning

- H2: The quality of learning conferencing software is positively associated with student satisfaction with online learning

- H3: The quality of learning devices is positively associated with student satisfaction with online learning

The proposed model illustrating the hypotheses mentioned above is built as in Figure 1.

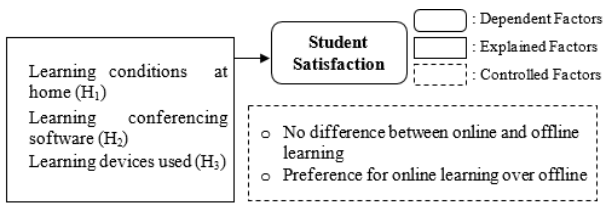

Fig. 1: Proposed research model

IV. RESEARCH RESULTS

A. Students' experience of using online learning conferencing software

The Covid-19 pandemic has impacted many aspects of life, especially in education where the pandemic has had a significant effect on the learning processes of students. Online learning is most often deployed using LMS platforms and web conferencing tools, and meeting applications were provided to students by universities aiming to maintain contact and communication during courses. Results from the study demonstrate that online learning platforms that are fully functional and easy to use strongly influence student satisfaction when learning online. Table 1 below illustrates the respondents' experience using the different online learning platforms that were deployed at the university.

Table 1 indicated that Google Meet was the most popular online learning platform, accounting for 63% of students' choices. The LMS system took second place, selected by 36.6% of students. Even though Zoom is a popular platform globally and easy to use, not many students selected this platform (0.4%). Compared to other platforms, Google Meet is easier to use and install on devices [24]. The LMS is widely used by students since they register for admission. The LMS can share learning resources, share and receive assignments, and give assessments and feedback. The LMS is usually used as a learning medium to improve critical thinking skills [45]. Moreover, students can check their academic results, timetables, examination schedules, training programs, and program outcome standards on the LMS system. Unlike the LMS, the Zoom platform limits the number of participants and meeting duration, so Zoom is less flexible than Google Meet or LMSs [46]. In addition to describing the respondents experience with online platforms, Table 1 also indicated that most students used computers or laptops (56.9%) to study online, and that most students (61.5%) have 1-2 years of experience using online learning platforms.

B. Student satisfaction with factors influencing the online learning process

The results of the study also demonstrated that student satisfaction with training quality is influenced by the three factors learning conditions at home, learning conferencing software, and learning devices used. The study used one-way ANOVA to compare the average satisfaction level of Engineering-Technology students when learning online. The analysis used a mean value of 3 or greater to determine if students are satisfied with the quality of online learning, and 3 or less if they are dissatisfied with the quality of online learning. Table 2 demonstrates student satisfaction with the three factors influencing the online learning process.

The results presented in Table 2 indicate that all variables in the satisfaction variable have average values above 3. It shows that most students are satisfied with the online learning quality and are not influenced strongly by the factors mentioned above. Additionally, the analysis shows no difference in the satisfaction level of respondents from different genders. Besides that, there is no significant difference in statistics of respondents having different lengths of user experience. One significant difference was found with the variable 'Learning Conferencing Software' of which 4 out of 5 items have the P-value < 0.05, showing that user experience helps users know which platforms are more optimal.

C. Checking the reliability of the scale

The model used in the study includes three independent concepts and a first-order unidirectional dependent concept. Each of the four concepts is measured indirectly and has at least three items of questions (observed variables). Table 3 below illustrates the results of Cronbach's Alpha coefficient analysis of the observed variables to check the scale's reliability.

Table 3 shows that the coefficients of Cronbach's Alpha of the concepts are all larger than 0.6, and the correlation coefficients of the total variables of the questionnaires are all greater than 0.3. It indicates that the scale is reliable, and no observed variables are excluded from the scale.

Table 1: Engineering-Technology students and experience of using online learning software

Characteristic	Total (N = 999)		Male (n = 238, 23.8%)		Female (n = 761, 76.2 %)	
	n	%	n	%	n	%
Learning Conferencing Software						
Google Meet	977	63.0	233	23.8	744	76.2
LMS	568	36.6	139	24.5	429	75.5
Zoom	6	0.4	2	33.3	4	66.7
Using Experience						
Less than 1 year	237	23.7	62	26.2	175	73.8
From 1-2 years	614	61.5	146	23.8	468	76.2
More than 2 years	148	14.8	30	20.3	118	79.7
Devices						
Computer/Laptop	626	62.7	158	25.2	468	74.8
Smartphone	360	36.0	75	20.8	285	79.2
Tablet	13	1.3	5	38.5	8	61.5

Table 2: Student satisfaction with factors influencing the online learning process

Factor	Mean	Gender			User Experience Duration		
		Male	Female	P-value	< 1 year	≥ 1 year	P-value
Learning conditions at home (CON)	**3.764**						
CON_1: Fully equipped learning devices used		3.84	3.92	0.227	3.78	3.94	**0.019**
CON_2: Stable connection		3.48	3.48	0.950	3.50	3.48	0.783
CON_3: Quiet, undisturbed study spaces		3.63	3.76	0.053	3.69	3.74	0.468
CON_4: Proactive in study space and time		3.82	3.98	**0.029**	3.84	3.97	**0.049**
Learning Conferencing Software (SOF)	**3.991**						
SOF_1: Easy-to-use learning conferencing software		3.94	4.02	0.190	3.84	4.05	**0.002**
SOF_2: Easy-to-install on different devices		3.96	3.99	0.628	3.92	4.00	0.182
SOF_3: Compatible with different operating systems		3.98	3.97	0.868	3.86	4.01	**0.020**
SOF_4: Moderate capacity, harmless to the device		3.95	3.95	0.963	3.82	3.99	**0.011**
SOF_5: Suitable for online learning		4.00	4.06	0.329	3.93	4.08	**0.016**
Learning devices used (DEV)	**3.583**						
DEV_1: Integrating different tools (camera, headphones) to enhance the interactivity		3.64	3.64	0.971	3.58	3.65	0.321
DEV_2: Easy to use the learning tools on every device		3.65	3.70	0.451	3.59	3.72	0.056
DEV_3: Self-adapted configuration with various online learning conferencing software		3.66	3.65	0.831	3.59	3.67	0.231
DEV_4: The device is regularly upgraded to a new version for the operating system		3.56	3.52	0.557	3.46	3.55	0.178
DEV_5: The device's price does not impact the online learning process much		3.40	3.41	0.971	3.33	3.43	0.178
DEV_6: Devices with the same operating system easily synchronize data with each other		3.61	3.59	0.845	3.53	3.62	0.211
Satisfaction with Online Learning Process (SAT)	**3.835**						
SAT_1: Maintain learning progress		3.73	3.79	0.401	3.69	3.80	0.107
SAT_2: Improve student morale and academic performance		3.56	3.67	0.170	3.57	3.67	0.174
SAT_3: Enhance students' computer skills and technology practice		3.83	3.96	0.084	3.86	3.95	0.198
SAT_4: Easy to share with many different people		3.90	3.95	0.503	3.84	3.97	0.050
SAT_5: Contribute to the digital transformation in education		3.85	3.86	0.905	3.77	3.88	0.092
SAT_6: Contribute to the assessment of lecturers' online teaching skills		3.82	3.88	0.400	3.79	3.89	0.137

Table 3: Cronbach's Alpha coefficient analysis results

Variables	Number of Items	Overall Cronbach's Alpha	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Learning conditions at home (CON)	4	0.878	0.712 - 0.789	0.822 - 0.854
Learning conferencing software (SOF)	5	0.954	0.811 - 0.894	0.939 - 0.953
Learning devices used (DEV)	6	0.944	0.755 - 0.900	0.925 - 0.943
Satisfaction (SAT)	6	0.952	0.816 - 0.894	0.939 - 0.948

D. Exploratory factor analysis

The results of the exploratory factor analysis show that the KMO value = 0.957 (greater than 0.5), the Sig. Bartlett's Tests value = 0.000 (less than 0.05), Eigenvalue = 1.018 (greater than 1), and data extracted three factors with the total variance extracted being 79.4% (greater than 50%). The smallest loading factor is 0.688 and no items were excluded due to meeting the convergence and discriminant value conditions. Accordingly, factor 1 (DEV) corresponded to the concept of 'Learning devices used' and including variables DEV1, DEV2, DEV3, DEV4, DEV5 and DEV6. Factor 2 (SOF) corresponded to the concept of 'Learning Conferencing Software' and included variables SOF1, SOF2, SOF3, SOF4 and SOF5. And factor 3 (CON) corresponded to the concept of Learning conditions at home', including variables CON1, CON2, CON3 and CON4. Finally, the dependent factor (Y) corresponded to 'Satisfaction' and included variables SAT1, SAT2, SAT3, SAT4, SAT5, and SAT6.

Next, the study did EFA analysis for the dependent factor "Satisfaction," resulting with a KMO = 0.919 (greater than 0.5), Sig. Bartlett's Test value = 0.000 (less than 0.05), and Eigenvalue = 4.831 (greater than 1). Data extracted 1 factor with the total extracted variance being 80.9% (greater than 50%). The results from the factor matrix indicate that there is one factor extracted with the smallest loading factor coefficient of 0.871 and no observed variables are excluded from the EFA analysis.

E. Regression results

Next, the study evaluated the regression equation of factors affecting satisfaction when using online learning conferencing software. The study first calculated the correlation coefficient between pairs of independent variables and the VIF index to test the model for violation of multicollinearity. The estimated results of the correlation coefficient and VIF index are shown in Table 4.

The results in Table 4 show that the correlation coefficient between the two independent variables DEV and SOF has the highest value (r = 0.770) and the highest VIF index (2.772 < 3). This result confirms that the multicollinearity in the model is not too extreme. The regression results are presented in Table 5 below.

The regression results shown in Table 5 indicated that the regression coefficients of DEV, SOF, CON, D1 and D2 all have positive signs and are statistically significant at a 1% significance level. This result indicates that Learning Devices, Learning conferencing software, Learning conditions at home, No difference between online and offline learning, and Preference for online learning over offline positively influence Satisfaction when using online learning conferencing software. From the regression coefficients, the study builds a standardized regression equation in the following order:

$$SAT = 0.190DEV + 0.468SOF + 0.213CON + \varepsilon$$

The analysis results and the linear regression equation show that the factor having the most influential impact on student satisfaction for Engineering-Technology students is learning conferencing software with a Beta value = 0.468. Thus, the research hypothese set at the beginning of the study (H1), (H2), and (H3) were all correct and no hypothesis was rejected.

F. Difference in satisfaction between respondents with different academic years

The ANOVA analysis also tested the difference in satisfaction between respondents from differ-

Table 4: Correlation Matrix

Research Variable	SAT	DEV	SOF	CON	D_1	VIF
SAT	1.000					----
DEV	0.686***	1.000				2.424
SOF	0.770***	0.744***	1.000			2.772
CON	0.681***	0.655***	0.708**	1.000		2.174
D_1	0.203***	0.087***	0.105**	0.123***	1.000	1.073
D_2	0.056***	0.025***	0.020*	0.000 **	0.228***	1.057

**** level of significance 1%; ** level of significance 5%; * level of significance 10%*

Table 5: Regression results

Observed Variable	SAT: Satisfaction			
	β	Std. Error	Beta	t. stat.
Constant	0.251**	0.8084	----	2.985
DEV: Learning devices used	0.190***	0.029	0.190	6.600
SOF: Learning conferencing software	0.493***	0.033	0.468	15.149
CON: Learning conditions at home	0.223***	0.029	0.213	7.803
D_1: No difference between online and offline learning	0.169***	0.032	0.100	5.216
D_2: Preference for online learning over offline	0.104***	0.042	0.048	2.493
Number of observations	999			
Adjusted R^2	65.7%			
D_1: Dummy Variable, D_1 = 1 if student has no diffirence, otherwise D_1 = 0				
D_2: Dummy Variable, D_2 = 1 if student prefers to study online, otherwise D_2 = 0				

**** level of significance 1%; ** level of significance 5%; * level of significance 10%*

ent academic years. The results are presented in detail in Table 6.

The results of the ANOVA test in Table 6 show that Sig Levene's test value = 0.000 < 0.05. Therefore, the hypothesis of homogeneity of variance between groups of qualitative variable values has been violated, and the study continued to use the Welch test. The result of Levene's Robust Test = 0.000 < 0.05, so the researchers concluded a statistically significant difference in student satisfaction between the different academic years. Tamhane's test result illustrates the difference in satisfaction levels: the Freshmen and Sophomore groups and the Freshmen and Junior groups resulted in a value = 0.000 < 0.05. Hence, there is a difference in satisfaction levels between these groups. The Mean Difference value of the Freshmen group compared to groups of sophomores and juniors both had positive signs and are relatively high, which shows that the satisfaction with the quality of online learning in the Freshmen group is higher than that of the other two groups. The P-value of the remaining pairs of groups is higher than 0.05. Therefore, there is no difference in the satisfaction level with online learning quality between these groups.

V. DISCUSSION

Based on the above results, this study has demonstrated the relationship as well as measured the influence of factors affecting student satisfaction in the process of online learning at the university. Accordingly, the influencing factors have a positive relationship with student satisfaction. Through average satisfaction statistics and linear regression analysis, it was determined that the majority of students are satisfied with the learning process they have participated in during the time. In particular, the learning conferencing software factor had the greatest impact on student satisfaction, followed by learning conditions at home and learning devices used. Additionally, the study determined a difference in the level of satisfaction in different student groups with the quality of online training. Freshmen generally experienced a higher level of satisfaction than sophomores and juniors.

While the epidemic situation was complicated in between 2020 and 2022, the Ho Chi Minh City government 2021 implemented social distancing

Table 6: ANOVA analysis of the student satisfaction of users with different academic years

ANOVA descriptives						Tamhane's Multiple Comparisons of mean differences		
Academic year (I)	Mean	Std. Deviation	N (999)	P-value Levene Test	P-value Robust Test	Cluster Number of Case (J)	Mean Difference (I – J)	P-value
Freshmen	3.971	0.774	556	**0.000**	**0.000**	Sophomore	0.2989	**0.000**
						Junior	0.3461	**0.000**
						Senior	0.2456	0.790
Sophomore	3.672	0.911	293			Freshmen	- 0.2989	**0.000**
						Junior	0.0472	0.995
						Senior	- 0.0532	1.000
Junior	3.625	0.769	12			Freshmen	- 0.3461	**0.000**
						Sophomore	- 0.0472	0.995
						Senior	- 0.1005	0.998
Senior	3.726	1.043	28			Freshmen	- 0.2456	0.790
						Sophomore	0.0532	1.000
						Junior	0.1005	0.998

** *The mean difference is significant at the 0.05 level*

policies to ensure the safety of people, causing all activities to come to a halt [47]. However, the fact that students still fully participate in online learning activities has shown that students' learning spirit and self-study capacity have still been maintained. Besides, a good curriculum plus suitable and fully functional learning conferencing software is one of the core factors that satisfy students. Although the effects of Covid-19 are still there, online learning has become increasingly popular among students. The application of online learning methods to maintain academic results is considered a constant step forward for education.

According to Archambaul et al. [48], the use of social networking sites as well as new learning tools also contributes to student support and feedback and increases interaction and effective communication between lecturers and students. Using online learning platforms such as Edmodo or Quipper can support the applyication of technology in teaching, making teaching and learning easier [49, 50]. Besides, Edmodo also helps learners develop their communication skills and save time for learning [51]. Therefore, for students using Google Meet and the LMS as their main online learning tools, it shows that there are many additional platforms that have convenient features and improve ease of use. While the study showed that students are satisfied with learning platforms and are used are fairly well, it is necessary to have regular reviews and updates to bring a better online learning experience to students.

Research by Liu, Lomovtseva & Korobeynikova shows that the successful application of information technology in teaching can bring a remarkable improvement for 'unqualified' students is up to 50%. The study compared and analyzed distance education platforms such as Open EdX, Moodle and NEO LMS and emphasized free access, the decrease in education fees, lesson contents divided into modules, flexible education, and keeping up with the pace of students' modern lifestyles [52]. Hence, every educational institution can use different online platforms depending on their conditions and the needs of their specific students. However, the main purpose is to maintain students' learning processes, help students access advanced science and technology, and unlock their potential.

The study's results noticed a significant difference in the level of satisfaction between stu-

dent from different academic years. However, the study by Giao and Tien [53] shows no difference in the satisfaction level with training quality of part-time students in different academic years. The research by Nguyen and Doan [54] assessed student satisfaction with the university training service via e-Learning. Tangible mediums (learning conditions at home) have the greatest influence on students' satisfaction, while the study results indicate that learning platforms have an enormous effect. Therefore, in addition to the learning conferencing software, learning conditions at home like each student's Internet connection, learning devices used, and teaching programs also strongly impact their satisfaction with online education quality [54].

As for devices used for online learning, most students use smartphones and laptops or desktops for online learning because of their convenience. These can be considered two necessary devices that every university student must equip themselves (see Table 1). In contrast, tablets are often more expensive than phones and are bulky, so they are rarely used by students, although their effectiveness is not inferior to smartphones. Authors Wilkinson and Barter studied the impact of tablets (e.g. the Ipad) on higher education. The results indicated that the Ipad positively impacted school attendance, performance, and progress, indicating the need for a tablet-integrated framework to maximize the learning experience [55]. Therefore, although tablets are not always widely used due to their expense, tablets combine many features and functions better than smartphones, like larger screens with higher resolutions to increase interactivity during use, a larger harddrive capacity to store more documents, the ability to use more apps and software, and a longer battery life.

When the pandemic will end is a big question that remains unanswered. Therefore, educators always need to learn from student experiences with learning platforms and how to improve student satisfaction. An effective learning platform will bring to students significant benefits consisting of improving learning quality and learning outcomes and maintaining students' academic progress without delays from Covid-19. In addition, by improving factors like conferencing software, student satisfaction between online and offline learning may ultimately be the same. In addition, effective deployment of online learning may contribute to user satisfaction, improve the quality of the learning, and make students more interested in technology-integrated learning and work, especially during the Covid-19 pandemic.

Compared with the above studies, factors affecting student satisfaction like conferencing software and the quality of online curriculum are less important during traditional instruction when online technologies are used less, if at all. Generally, students still prefer traditional teaching and learning methods over online learning. It is impossible to compare which form is better than the other. Each form of learning will have its advantages and limitations, especially in the context of the pandemic. Students have no choice but to learn online to maintain their learning processes [38, 56–60]. Therefore, education managers need to have a multi-dimensional view and develop appropriate policies to maintain and improve the quality of teaching and learning strategies in study environments.

In addition, school leaders must update and develop their LMSs and conferencing platforms to create an optimal and effective learning environment for students that is comparable to face-to-face instruction. The school should announce a policy of emulation and reward groups and individuals with excellent academic achievement during online learning and give support to students who have not yet been provided with online learning technology. At the same time, the school can organize training sessions for teachers on handling unexpected situations or technical problems to ensure a satisfactory resolution of each problem. Lecturers may consider honing their online teaching skills by improving examples and classroom activities to encourage student learning and creativity. Besides, lecturers need to talk to students regularly to solve problems about learning that students have been encountering.

VI. CONCLUSION

The study highlighted the relationship between the influencing factors and student satisfaction

with online learning. The findings show that the majority of the surveyed students were satisfied with the current learning process and quality. Learning conditions at home, software, and devices have similar influences on student satisfaction with online training. Specifically, learning conferencing software has a strong influence on student satisfaction. Also, the study indicates that the experience of using online learning platforms or applications significantly contributes to the level of satisfaction of students with online learning.

In the context of the Covid-19 pandemic, online learning is considered an effective educational solution. Therefore, education administrators should develop appropriate policies to create and maintain a motivating learning environment for students. The findings indicate that learning conferencing software is the main influential factor in student satisfaction which directly influences the learning process and the student's academic results. For that reason, improving the quality of learning conferencing software used in online learning needs to receive attention. Besides, it is also imperative to raise teachers' technical skills.

The study results also demonstrated that students will still prefer offline learning when the pandemic ends. Hence, it helps education administrators come up with appropriate policies to improve teaching quality and student satisfaction. Although the experiences and contexts at other universities vary, this study can be further extended to other disciplines and other universities in Vietnam.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest concerning this article's research, authorship, and publication.

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