Factors Affecting Students' Desire to Take Upcoming Online Courses after E-learning Experience During COVID-19

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Abstract—Since 2020, COVID-19 has completely changed the daily activities of almost all nations, and education has been heavily affected. Because of school closures, face-to-face classrooms were halted or replaced with online classes in which both lecturers and learners had to adjust their teaching and learning styles to cope with unexpected situations. The 'new normal' of learning from homes, spending hours staring at screens, and struggling with piles of online tasks has somehow demotivated students to continue learning. This study explores factors affecting students' desire to take online courses after experiencing e-learning during COVID-19. Nine hundred fifty-five students of Vietnam National University took part in the survey via an online questionnaire. Data were analyzed using SPSS 20; correlation, hierarchical regression was employed to examine how online factors influence students' decision. The research results showed that skill enhancement, self-regulated learning, lecturer interaction during the course were among the most important predictors of students' desire to take more online courses. In contrast, student interaction imposed no significant influence. This study gives the theoretical background for other studies in the same field and suggests practical implications for governments and universities to implement online training better to cope with the pandemic.

Keywords—mobile learning, online learning, student satisfaction, interaction, technical support, skill enhancement, COVID-19

1 Introduction

Although mobile learning has been a new phenomenon in the past few decades, its benefits in high-quality education and learning processes are numerous. Several studies on mobile learning have been carried out to understand better how mobile devices are used in educational contexts [1]. Mobile learning is defined as learning that involves using a mobile device, either alone or in conjunction with other forms of information and communication technology, to allow students to learn at any time and anywhere [2]. This possibility shows that mobile learning could be beneficial to both students and teachers [3]. In general, mobile learning assists students in developing technical skills, conversing skills, finding answers, developing a sense of teamwork, allowing information exchange, and thus maximizing their learning results [4].

Mobile technology has expanded faster than any other technology in history, and developing countries have seen the highest growth rate in mobile technology acquisition [5]. It has led developing nations to skip some intermediate development stages that developed countries had to go through, such as erecting extensive electricity power infrastructures and constructing several computer rooms in educational institutions [6]. Though mobile learning experience in developing countries is limited, it offers good prospects for cost-effective ways of delivering quality learning through open and distance learning provisions, as Lamptey & Boateng [7] point out, and has emerged as a new trend in these countries' education systems including Vietnam.

Due to COVID-19, a severe disease caused by Coronavirus Sars-Cov-2, routine activities in almost all countries have been badly affected. The consequence of the lockdown and social distancing has led to a dramatic change in education. Thousands of universities and colleges have been closed to foster social distancing and limit the virus's spread. This catastrophic scenario raises many problems, including the decline in educational quality and the student's prospects [8]. Therefore, all educational institutions have placed a premium on adopting innovative teaching techniques and approaches to maintain the quality and continuity of student learning [9]. Mobile learning is one of the most acceptable options in this case.

Under the same situation of COVID-19, the Ministry of Education and Training (MOET) of Vietnam released a decision to formally switch education mode from traditional face-to-face learning to e-learning in the time of school closures. No sooner had the Vietnamese government released the order of social distancing at the end of March 2020 than Vietnam National University (VNU) promulgated Documentary No. 944/ĐHQGHN-ĐT to give guidelines on how to carry out online teaching and learning among its university members. Although lecturers and students are familiar with basic ICT, the sudden change has caused challenges in teaching and learning. The lack of e-learning course design format, physical interaction learning environment, teaching methodologies of lecturers, interaction, and students' motivation can be obstacles for both lecturers and students to achieve their education goals. Many students realized that they had no other choice but to use modern online technologies to fulfill their learning tasks and safely keep in touch with their instructors to preserve social distance [10]. While ICT application is one of the most potent tools to speed the growth of online learning, the swift switch to fully online learning may cause some negative impacts on students. As a result, various roadblocks may hinder students' learning processes, causing them to be hesitant to enroll in future online courses [11].

For such reasons, it is essential to study the critical factors affecting students' intention to continue using future online courses since few studies have been related to this topic and online mobile applications learning [11]. The results of this research will contribute to the theoretical framework of mobile learning or online learning acceptance and set the ground rules for school managers, teachers, and policymakers in carrying out the necessary training and supports to enhance online learning quality and student's continuity with online courses. The lesson learned from the circumstances of confinement caused by the coronavirus will also force a generation of new laws, regulations, platforms, and solutions for future cases [12].

The primary purpose of this research was to explore factors affecting students' desire to take upcoming online courses after experiencing tailored online courses in

an emergency to cope with the pandemic. For this purpose, we collected data when the semester ended, and students could have insights into their online learning to clarify the motivating factors for their future online course decision. This study also applied SPSS 20 to test hypotheses and path connections among factors in the model developed. Towards that end, the study posed a research question and six hypotheses:

– How do six variables (interaction with lecturers, interaction with students, peer support, self-regulated learning, technical support, skill enhancement) influence students' desire to take the upcoming online course after their learning experience during COVID-19?
  H1. Interaction between students and lecturers significantly affects students' desire to take upcoming online courses.
  H2. Interaction between students significantly affects students' desire to take upcoming online courses.
  H3. Peer support significantly affects students' desire to take upcoming online courses.
  H4. Self-regulated learning significantly affects students' desire to take upcoming online courses.
  H5. Technical support significantly affects students' desire to take upcoming online courses.
  H6. Skill enhancement significantly affects students' desire to take upcoming online courses.

Apart from the introduction, the rest of the paper is organized as follows. In Section 2, some literature is reviewed about mobile learning, online learning mode, the role of students' satisfaction in defining the quality of online training courses. Section 3 presents the research method of the study. In the next part, the authors showed the main findings of the research, and the final section presents concluding remarks and suggestions for further study.

2 Theoretical background

2.1 Mobile learning, online learning, and e-learning in the new era

Modern technological advancements enable the creation of low-cost, inventive, portable, and digital technologies [13], which assist students in developing the capacity to overcome learning difficulties [14]. Because of its portability, ICT has improved at an incredible rate over the last decade, and mobile devices have expanded in popularity and importance in our daily lives. By 2023, about 70% of the world's population will own a cell phone, according to Cisco's annual Internet Report (2018–2023) [15]. With the help of current technologies, online learning (learning that takes place over the internet) has become more popular even at the schools that formerly only offered face-to-face learning. Mobile learning is a subset of online learning or e-learning. It refers to the process of learning in a variety of situations via social and information exchanges using mobile devices such as laptops, cellphones, and wearable technologies. It is a

type of distance learning where students employ instructional tools on mobile devices at their convenience [16].

Before the pandemic, schools mainly taught in person. When facing the COVID-19 epidemic, virtually every educational institution, from kindergarten to university, has shifted to online learning. These caused the entire world to rely on mobile learning to remain teaching and learning in the context of social distancing [17]. Due to the COVID-19 epidemic, about 1.6 billion students could not attend physical classes, resulting in over 91 percent of all students enrolling online [18]. In the context of the pandemic, mobile learning, online learning, and e-learning are brought much closer in the concepts. They all refer to the mode of learning with the internet connection and portable device support.

2.2   Learning mode

Two predominant educational modes are typically used: face-to-face instruction and online instruction. According to Kasser et al. [19], there are three types of learning environments: synchronous, asynchronous, and blended learning. In detail, Gazan [20] defined face-to-face learning as a typical physical or live virtual classroom where the teachers and students interact in real-time, as a synchronous environment. On the other hand, it is an asynchronous workplace when teachers and students work in various time zones. The combination of synchronous and asynchronous learning is referred to as blended learning. The degree to which asynchronous and synchronous learning is expanded varies in a hybrid learning environment. These possibilities are depicted in Figure 1 and are referred to as the synchronicity spectrum.
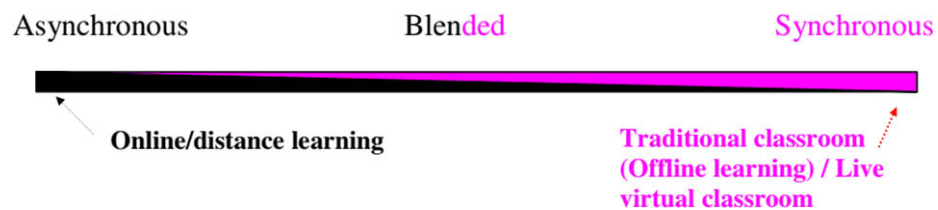

Fig. 1. The spectrum of synchronicity

Because of the COVID-19 pandemic, many educational institutions worldwide had to switch to online synchronous or asynchronous mode. Universities combined non-real-time learning activities (*asynchronous*) and live virtual classrooms where students and instructor gather at the same time through several platforms such as Google Meets or Zoom meetings (*synchronous*).

2.3   Role of students' satisfaction in defining quality of online courses

Following the viewpoint that quality is the appropriateness and level of objective achievement, more and more universities are applying the student-centered

approach [21]. According to Papadakis [22], to achieve more effective learning at higher levels, we need instructional strategies focused on the students, which allow them to learn by doing. The key idea of this approach is to consider students as customers. Universities must try to offer the best educational services for their learners, as stated in [21], which will make them satisfied and retain strong motivation to continue their learning at the university [23].

Moreover, in the context of Industrial Revolution 4.0, educational institutions have to gradually integrate online learning into their traditional training to meet their students' needs and societal demands. As a result, blended courses combining online and onsite learning are increased so that students can choose to learn at their suitable time and place. With an online platform, students can work with friends via an online forum, receive feedback from lecturers and peers, do tasks and submit their work with a click. The experience, therefore, tends to shape students' views on blended or online learning and affect their satisfaction level and decision to continue their study with this learning mode, [24]. The satisfaction rate strongly links students' commitment to complete their course, motivation, determination, and drop rates [25]. Previous studies have suggested several determinant factors influencing online student satisfaction, for example, instructor, technology, interactivity, course constituents, and course management as shown in Figure 2 below [26].
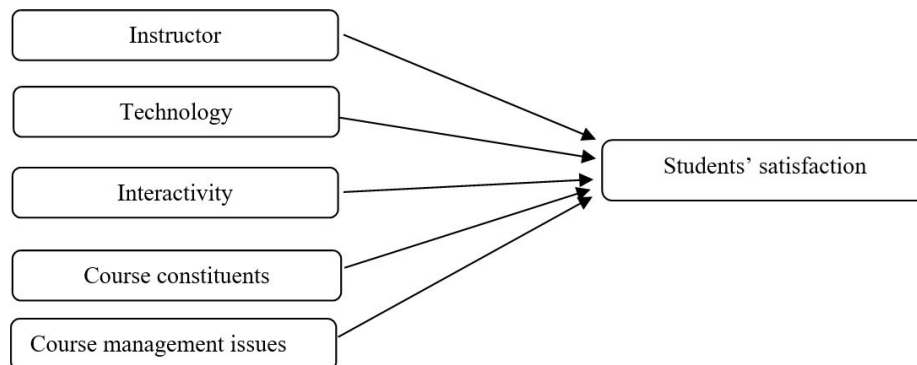

Fig. 2. Bolliger and Martindale's model of students' satisfaction in an online course

This view is further developed by Kuo et al. [27], showing that interaction is the main factor affecting students' satisfaction, persistence, and success in distance education. Other study by Alqurashi [25] also affirm the central role of interaction in online learning satisfaction. The limited interaction and other online learning obstacles have negatively affected students' performance and satisfaction with the course [26]. The term "interaction" can be generated as the connection or direct involvement between learners and learners, learners and instructors, learners and content, and more. According to Prohorets & Plekhanova [28], there are different types of interactions in a blended learning environment which can be included as in Table 1:

Table 1. Interaction types in a blended learning environment

Gilbert & Moore [29]	Hanna et al. [30]	Liang & Bonk [31]	Stanley [21]
student-content student-instructor student-student	human interactions non-human interaction	learner-content learner-learner learner-instructor learner-self learner-interface	student-to-student student-to-teacher student-to-community student-to-material student-to-technology

Besides interaction, there are other factors affecting students' satisfaction and desire to take upcoming online courses, such as self-regulated learning, assessment scheme, supports from others [32], [33]. Self-reflection and self-reaction activities such as writing reflection on the course forum, giving comments or feedbacks are common forms of self-regulated learning. Besides, other elements involved in the online learning process such as supports from peers and schools, technology skills, technical instruction and support, course design also play critical roles in students' satisfaction [34]. In addition, [35] revealed that students' perception of the e-learning environment and their skills affect their overall satisfaction.

3   Research method

A quantitative approach with a convenient sampling method was used for this study. An online survey was designed using Google Form and distributed via email to students due to the lockdown, and data was then analyzed using SPSS 20.

The research has two main stages of data collection. A pilot survey was sent to 90 students at stage one, two items were removed, and two items were revised after checking the exploratory factor analysis (EFA) and reliability (Cronbach's Alpha). All students in the pilot test were excluded from the primary survey. At stage two, an email explaining the survey purpose was sent to students' registered email to invite them to participate in the study. A survey link and QR code for the survey was attached to the email so that students could access the questionnaire online.

Questionnaire items were anchored with a 4-point Likert scale running from 'don't agree, 'somewhat don't agree, 'quite agree,' and 'agree' to get a specific response and avoid safe 'neutral' choice for their remarks with the new learning style they have experienced. The questionnaire has two main parts, the first part asked about the demographic characteristics of respondents, the second part was formulated into seven sections (1) interaction with lecturers, (2) interaction with peers, (3) self–regulated learning, (4) technical support, (5) skill enhancement, (6) peer support and (7) desire to take upcoming online courses of their programs.

955 students took part in the study through the Google Form link. Regarding the major of students, 5% were from Science, 17.5% were from Languages and International Studies, 12.4% were in Engineering and Technology, 19.5% were from Economics and Business, 24.7% studied Social sciences and Humanities, and 20.9% studied education. Data collected from the survey was analyzed with SPSS 20. Table 2 reports the summary of the survey sample, including gender, academic year, time spent on online tasks, devices for learning, and the online learning platform used.

As shown in Table 2, female respondents were outnumbered by 73.7%, whereas the percentage of male students was 26.3%. More than half of the respondents (59%) were 1st-year students, while 41% were in their second, third, or fourth year. Because students could attend classes anywhere, anytime, as long as they had a stable internet connection, four popular devices were chosen. Students used laptops (66.6%) and smartphones (27.3%) more than desktops for their online learning, and very few students used tablets. About 28% of students spent less than 10 hours on their online assignments, including reading materials, watching videos, and discussing forums. The number of students spending from 10 to 30 hours each week on their online tasks made up 57.2% of the sample, and the percentage of students who spent more than 30 hours doing online tasks was 14.8%. Since all subjects were taught online in real-time and students had to attend classes, as usual, the result indicated a high rate of time spent doing online tasks to fulfill the requirements of the course besides their class time.

Table 2. Demographic information

Demographic Information	N = 955	%
Gender		
Female	704	73.7
Male	251	26.3
Academic year		
First-year	563	59.0
Second-year	145	15.2
Third-year	156	16.3
Fourth-year	91	9.5
Devices used for online learning		
Desktop	53	5.5
Laptop	636	66.6
Smartphone	261	27.3
Tablet	5	0.5
Time spent on online tasks per week		
<10 hours	267	28
From 10–30 hours	546	57.2
From 31–60 hours	103	10.8
>60 hours	39	4.0

According to the data, out of 955 respondents, the number of Zoom users was outstanding with 823 choices (86.1%), the second favorite online platform was Google classroom with 504 choices (52.7%) which nearly doubled Microsoft Teams with 286 (29.9%). UPM, an online learning platform created by a Vietnamese company, was introduced and used by 247 students accounting for 25.8%. Google hangout and Skype, which initially were not created for educational purposes, stood at the last line with 77 choices (0.8%) and 44 choices (0.46%).

4   Results

This study used Cronbach's Alpha value to assess the internal consistency of each multi-item within the scale. All calculated Alpha values were above 0.77, indicating that the scales were reliable. The Principal Component Analysis was performed to test the construct validity with the cut-off point of 0.5, and Varimax with Kaiser Normalization was used for the rotation method. The results are presented in Table 3.

Having examined the overall reliability of the instrument, we gathered the items measuring the same construct into the same group, the mean score was calculated for each construct. Lecturer-interaction was computed by taking the average score of 4 items of lecturer involvement. The computation continued with self-regulated learning from 5 items, technology support (4 items), skill enhancement (3 items), peer active interaction (4 items), and peer support (4 items). The results are summarized below:

- LECT1, LECT2, LECT3, LECT4 measure the same construct; hence, are grouped into LECTURER INTERACTION
- SELFREG1, SELFREG2, SELFREG3, SELFREG4, SELFREG5 measure the same construct, hence, are grouped into SELF-REGULATED LEARNING
- TECH5, TECH6, TECH7, TECH8 measure the same construct, hence, are grouped into TECHNICAL SUPPORT
- SKILL1, SKILL2, SKILL3 measure the same construct, hence, are grouped into SKILL ENHANCEMENT
- PEER1, PEEER2, PEER3, PEER4 measure the same construct of interaction with peers were grouped into PEER INTERACTION
- PEER5, PEER6, PEER7, PEER8 measure the same construct of peer collaboration were grouped into PEER SUPPORT

Table 3. Principal component analysis

Coding	Content	Component					
		1	2	3	4	5	6
LECT1	Lecturers provided necessary materials and information on the online platform	.736					
LECT2	I received feedback from lecturers during online courses	.688					
LECT3	Receiving lecturers' feedback on my works and tests helped me progress in learning	.616					
LECT4	I had chances to give feedback on lecturers' teaching and lesson content	.583					
SELFREG1	I organized my learning plan		.741				
SELFREG2	I regulated my online learning (e.g., prepare for lessons, submit tasks on time ...)		.669				
SELFREG3	I searched for other learning materials to better fulfill the tasks		.642				

(Continued)

Table 3. Principal component analysis *(Continued)*

Coding	Content	Component					
		1	2	3	4	5	6
SELFREG4	I archived documents (e.g., tests, lecture notes) for consolidation		.554				
SELFREG5	Self-assess my learning plan helped me achieve my study goals		.511				
TECH5	I received technical supports from school during online courses			.768			
TECH6	I received updated information on the online learning mode			.695			
TECH7	I could participate in training on using online platforms			.671			
TECH8	I could give feedback on online learning			.604			
SKILL1	I acquired more soft skills (e.g., presentation, conflict solving)				.720		
SKILL2	I acquired more IT skills				.711		
SKILL3	I could apply learned knowledge to solve real-life problems				.585		
PEER1	I proposed solutions for group works					.816	
PEER2	I revised solutions basing on other member's suggestions					.778	
PEER3	I actively gave comments to clear the task issues					.617	
PEER4	I felt that I was a part of the class					.507	
PEER5	I actively asked for peer's support when I had difficulty with online learning						.805
PEER6	I received support from classmates with online tasks						.760
PEER7	I interacted with others in online lectures						.572
PEER8	I attended and gave feedback on an online forum with classmates						.515

Table 4 presents the mean, standard deviations, and correlations for each pair of constructs. The correlation analysis with alpha = 0.01 as the level of significance indicated a significant correlation among factors ranging from 0.391 to 0.599, and the results are reliable. The correlations demonstrate that students' desire to take upcoming online courses correlates with lecturer interaction, self-regulated learning, technical support, peer interaction, peer support, and skill enhancement. Skill enhancement is stably correlated with lecturer interaction ($r = 0.529$, $p < 0.01$), self-regulated learning ($r = 0.583$, $p < 0.01$), and technical support ($r = 0.563$, $p < 0.01$). Also, the moderate positive correlation between the desire to take upcoming online courses and the interaction with lecturers, peers, self-regulated learning, technical support, and skill enhancement means that as these variables increase, the desire to take other online courses also increases moderately.

Table 4. Descriptive statistics: mean, standard deviations, correlations of the constructs

	Mean	Std. Dev	1	2	3	4	5	6	7
Lecturer interaction	3.29	.5618	1						
Self-regulated learning	3.16	.5428	.532**	1					
Technical support	2.93	.6410	.517**	.478**	1				
Skill enhancement	3.17	.6688	.529**	.583**	.536**	1			
Peer interaction	3.09	.5851	.535**	.555**	.434**	.547**	1		
Peer support	2.97	.6648	.578**	.489**	.465**	.528**	.599**	1	
Desire to take upcoming online courses	2.96	.918	.423**	.489**	.392**	.477**	.391**	.408**	1

Notes: N = 955, *p < 0.05, **p < 0.01, ***p < 0.001.

Hypothesis testing. Hierarchical multiple regression analysis is used to examine the influence of controlling variables (lecturer interaction, peer interaction, peer support, skill enhancement, technical support, and self-regulated learning) on students' desire to take other online courses. Table 5 presents the summary of a four-step hierarchical regression model. Lecturer interaction is entered at stage one of the regressions to control students' desire to take other online courses. Peer interaction and Peer support are entered at stage two, Self-regulated learning at stage three, Technical support, and Skill enhancement at stage four.

Table 5. Summary of hierarchical regression analysis for variables predicting student's desire to take other online courses

Variable	Model 1			Model 2			Model 3			Model 4		
	B	SE	β	B	SE	β	B	SE	β	B	SE	β
Lecturer interaction	.691	.048	.423***	.384	.059	.235***	.285	.061	.175***	.185	.061	.113**
Peer interaction				.251	.058	.160***	.141	.060	.090**	.067	.059	.043
Peer support				.244	.053	.176***	.205	.052	.148***	.134	.052	.097**
Self-regulated learning							.364	.061	.215***	.216	.063	.127**
Technical support										.130	.050	.091**
Skill enhancement										.302	.052	.220***
R^2	.179			.234			.262			.299		
F for change in R^2	207.24***			34.35***			36.01***			25.19***		

Notes: N = 955, *p < 0.05, **p < 0.01, ***p < 0.001.

The overall model with four blocks and six variables is statistically significant and explains 29.9% of the variance in students' desire to take other online courses with

F (6, 948) = 67.45, p < 0.001. The hierarchical regression reveals that at Model 1, Lecturer interaction contributes significantly to the regression model F (1,953) = 207.24, p < 0.001 and accounts for 17.9% (R^2 = 0.179) of the variation in students' desire to take other online courses. For the second model, R^2 value increases to 0.234 or 23.4% of the variance. When Peer interaction and Peer support enter model 2, they account for an extra (23.4–17.9) 5.5% of the variance, which is statistically significant with F (3,951) = 96.82, p < 0.001. In the third model, the R^2 value is added up to 0.262 or 26.2%, self-regulated learning explains for an extra 2.8% after controlling for individual variables (lecturer, peer interaction, peer support) in Model 2, and this change in R^2 is significant with F (4,950) = 84.25, p < 0.001. For the final model (Model 4), its R^2 value stands at 0.299 or 29.9% of the variance; the appearance of two variables (technical support and skill enhancement) accounts for an extra 3.7% with F (6,948), p < 0.001. When all six independent variables are included in model 4 of the regression model, Lecturer interaction has a positive and significant impact (B = 0.185, p < 0.005, β = 0.213), thus Hypothesis 1 (H1) is supported. Peer interaction is not a statistically significant predictor of students' desire to take other online courses (B = 0.067, p = 0.26, β = 0.043). As a result, Hypothesis 2 is not supported.

Regarding other factors, the result shows that they have a positive and statistically significant impact on students' desire to take other online courses. Peer support (B = 0.134, p < 0.05, β = 0.97) has a positive and significant impact which supports Hypothesis 3. The impact of Self-regulated learning is statistically significant (B = 0.216, p < 0.005, β = 0.213) and supports Hypothesis 4. Technical support also shows its positive and significant impact (B = 0.134, p < 0.01, β = 0.91), which supports Hypothesis 5. Lastly, Skill enhancement (B = 0.302, p < 0.001, β = 0.220) supports Hypothesis 6 that skill enhancement has significant impact on students' desire to take other online courses.

From the results, Hypotheses 1,3,4,5 and 6 are supported, and Hypothesis 2 is rejected. The most influential predictor is Skill enhancement followed by Self-regulated learning, Lecturer interaction, Peer Support, and Technical support. The factors contributing to students' desire to take other online courses can be demonstrated as in Figure 3.
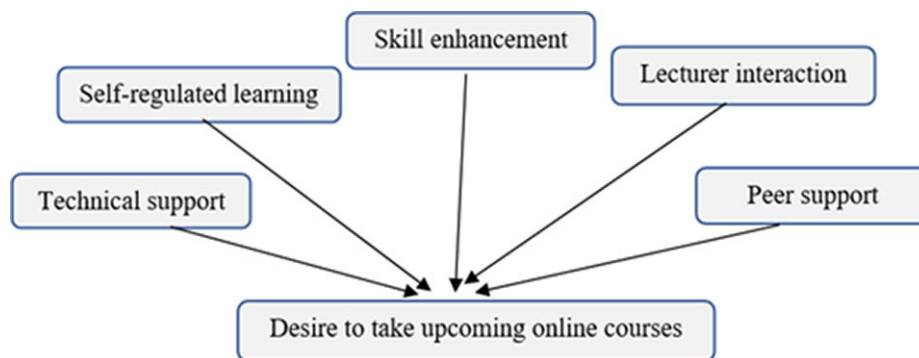

Fig. 3. Factors affecting students' desire to take other online courses

5 Discussion

The current study investigated the factors that contributed to students' desire to take upcoming online courses. This study provides some significant findings.

Firstly, the result supports the findings on the interaction between lecturers and students, and this interaction is the essential factor to a student's learning and satisfaction [36]. The findings strongly confirm the role of lecturers in e-learning which has a strong positive effect on students' desire to take forthcoming online courses. The result is confirmed by the findings of [37], who found that if online courses are based on student responses and proposals and supported by regular smart instructors' help, students may make a significant qualitative jump forward in their studies. The interaction and exchange of information between lecturer and students asynchronously and synchronously regarding learning content or social information develop and strengthen students' knowledge construction and set up and increase social relationships and motivation. Interaction and information exchange are crucial in learning [38]. This study result endorses previous research that the timely feedback of lecturers [39], well-designed and prepared material [40] are among the factors affecting students' satisfaction with the course. Lecturers should provide a course content structure, give feedback, stimulate students' motivation, assign suitable assignments, and advance their ICT skills [33]. Also, participation scores can be applied in online learning courses to boost students' interaction with lecturers and peers.

Secondly, technical support and skill enhancement play essential roles in students' desire to learn more online courses. Switching from face-to-face learning to online learning requires support and effort. For students, it is their first learning experience working 100% with laptops and smartphones without physical interaction with lecturers and peers. Technical support through the online help desk and online training are vital for students in the learning process. In addition, students develop and enhance their IT skills and soft skills when doing online tasks. This study indicates that the technical support and the skills students acquired from the new learning mode have heightened students' satisfaction and decision to learn more courses.

Thirdly, self–regulated learning and peer support are also among the key factors; students were on the way to finding a better way to manage their learning, such as finding other resources, self–assessment, planning study, and regulating study pace. Students value their peers' help when they have trouble working in a new learning environment. The support from peers and the ability to organize their learning will increase students' satisfaction with the course. The result suggests that peer-support groups should be established so that students can connect to seek and give support both in the onsite and online environment.

Perhaps the most surprising finding of this study is the insignificant effect of the student interaction variable. The result contradicts early studies but supports the findings by Kuo et al. [27] that student-student interaction did not significantly predict students' satisfaction in online courses. This finding implies that the online learning model has prevented students from active group work and reduced interaction chances. It is suggested that lecturers have clear guidance and set a reasonable time for group work online and outside class hours to become familiar with the new interaction model.

6 Conclusion

This study has presented the analysis of a survey conducted among Vietnamese students investigating factors that influence students' decision to take upcoming online courses after their COVID-19 learning experiences. The findings of this present study indicate that skill enhancement, lecturer interaction, self-regulated learning, technical support, and peer support are the determinants of students' desire to take more online courses. From the results, the study suggests that the role of lecturers in e-learning is vital. Responsive feedback and interaction from lecturers can enhance students' learning process leading to students' satisfaction. Besides, peer support should be encouraged and facilitated so that students can take full advantage of this resource. To make the learning process meaningful and satisfying, technical support, skill enhancement, and self-regulated learning should receive good attention to enhance learning.

The research results provide insights for leaders, researchers, and educational policymakers about an effective teaching and learning mode to use in an emergency and in a long-term plan to live with the COVID-19 and exploit technological advances. It also helps determine how to leverage motivation and satisfaction to optimize learning based on experiences gained from the pandemic and provides empirical evidence for studies related to satisfaction theories regarding online learning.

The study results suggest several further studies for future work. Similar studies should be conducted in various school settings to investigate the influence of culture, socio-economic status, geographical area. The effects of computer self-efficacy, technology anxiety should be examined to prepare teachers and students in their teaching and learning.

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