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Online learning amid Covid-19 pandemic: students' experience and satisfaction

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Abstract

The outbreak of COVID-19 Pandemic forced most higher education institutions around the globe to move their teaching and learning to online mode. This had huge impact on the students, especially for those who had not been used to being online for learning before. This mixed methods study utilized correlation, factor analysis and multiple regression techniques to identify significant predictors of students' satisfaction with online learning in a higher education institution in Vietnam amid COVID-19 Pandemic. The study results show that learners' interaction with content, peers and instructors correlated to and predicted student satisfaction. The study also indicated that although students valued the chance to be online for learning during the historic time, they viewed that interaction was limited and instructors should improve online teaching pedagogy. These findings provide learners, teachers and curriculum developers with new insights into learner interaction and its relation to course contents, teaching pedagogy and learning satisfaction in an Asian context.

KEYWORDS: Satisfaction, Course Content, Interaction, Online Pedagogy, Vietnam, Covid-19.

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1. Introduction

The beginning of 2020 was marked by an unprecedented phenomenon when most countries in the world were engulfed by Coronavirus infection disease (called COVID-19). It was generally viewed that air travel and tourism were the worst affected sectors, but the biggest change was in education whereby a record number of students at all levels were forced to study online because of class suspension. In this process, all countries affected by the pandemic became large-scale experimental sites for online teaching. While educational institutions in the West had delivered online courses before and were ready for the change, many schools and universities in the developing world had to rely on free applications like Zoom, G-suit to have 'classes on'. However, these make-shift online lessons could hardly satisfy students, many of whom might have never been online for learning before.

During this period a few studies were conducted worldwide on different aspects of online learning such as technology, achievements and deficiencies of online

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teaching implementation, effectiveness of online session (Lowenthal, Borup, West & Archambault, 2020; Nagar, 2020). From technological aspect, it seems that applications like Zoom and Google Meet were opted by many institutions; however, there were issues with Internet security, bandwidth for both teachers and students (Joseph, Kerryn, Rudolph & Matthias, 2020; Mukhtar, Javed, Arooj & Sethi, 2020). The main purpose of using these applications was to maintain traditional classes in an online mode due to social distancing and meeting the need of students and teachers to see and support one another in learning (Lowenthal, et al., 2020). In the same line of argument, a study by Nagar (2020) on students' perception toward e-learning and effectiveness of online lessons indicated that the use of appropriate technological facilities were key contributors of effective online learning.

Vietnam was praised by global media as having the best-organised epidemic control programs in the world, but like most of other countries, this tough measure affected people of all walks of life, especially students. They had the longest lunar new year in its modern history. Nonetheless, many schools, universities and television stations started to develop and deliver online courses for learners. According to statistics from the country's Ministry of Education and Training, although universities responded quickly to the situation, nearly half of them could not conduct online teaching professionally due to the lack of prior investment in learning and content management systems (Bich, 2020).

During the COVID-19 outbreak, most Vietnamese HEIs had to switch to online teaching and learning. The country's Ministry of Education and Training (MOET) issued an official document to provide guidelines for teaching most of subjects through the Internet and on TV (MOET, 2020). At higher education level, while a few universities had been used to this mode of lesson delivery with a certain level of readiness, for example, an existence of learning management systems (LMSs), most of other institutions did not have any options but to start training their teachers and students on pedagogical and technical skills to use Zoom or G-suite for lesson delivery. These video conferencing applications were preferred choices by most universities because not all teachers and students were well prepared for LMSs in their respective institutions while Zoom or G-Suite were more economical, user friendly and had the ability to provide many educational tools in one application (Spathis & Day, 2020; Thanh, Thong & Thao, 2020). While some educators and teachers consider this emergency delivery of lessons as online learning, specialists in the field view that these video conferencing applications and tools cannot replace a fully functional LMS (although they were both called 'Học trực tuyến' in Vietnamese language).

The migration from offline to online delivery of courses met the government's policy of "School is Out, but Class is On"; however, many issues emerged including technological and academic readiness of both teachers and students, quality assurance of online courses as well as motivation and satisfaction of all people who involved in the process. As learners have become the centre of learning process, it is crucial to conduct studies on factors that influence their satisfaction in online learning in order to lay suitable foundations for future investment and implementation of online teaching and learning. This is also the aim of this study entitled "Online learning amid COVID-19 pandemic: Students' experiences and satisfaction".

The study is guided by the following three research hypotheses.

- H1: Learner-learner interaction is positively related to learning satisfaction.
- H2: Learner-instructor interaction is positively related to learning satisfaction.
- H3: Learner-content interaction is positively related to learning satisfaction.

Learners' experiences and satisfaction in online learning is rooted in various works (Cox, Black, Heney & Keith, 2015; Kuo, Walker, Schroder & Belland, 2014) but studies in online interaction were based on Moore's (1989) model which classified online interaction into three main types: learner-content, learner-learner and learner-instructor. We believe that these three types of interaction are key contributors to students' enhancement of knowledge and skills, which in turn, make them satisfied with online learning experience. In order to confirm and complement the aforementioned hypotheses, we analysed participants' answers to the opened-ended question at the end of the questionnaire.

Interaction has consistently been considered as an important element of student satisfaction together with instructors' and learners' efficacies such as Internet, self-regulation, online teaching pedagogy as well as support from educational institutions for online learning (Kuo et al., 2014; Zaili, Moi, Yusof, Hanfi & Suhaimi, 2018). In this study, however, we only reported the influence of three types of interaction on the learners' satisfaction during their fully online study amid COVID-19.

1.1 Learner–Content Interaction

Interaction with content is the process in which learners exploit the materials that are embedded in the online course for their study purposes. Content delivered in an online course can be in different forms and formats, and be complete, relevant and accurate (Marzban, 2011). The online resources involve not only learning materials but also learning activities and assignments to help learners achieve learning outcomes (Abraham, 2008). With advanced evolution of different learning management systems (LMSs), the content of an online course (e.g., study materials and activities) can be

structured according to a variety of pedagogical needs of the course developers.

1.2 Learner–Instructor Interaction

In online learning environments, learner–instructor interaction has been found to be a significant predictor of student satisfaction and the most important one in guiding learners to interact with content and peers (Cox, et al, 2015; Kuo et al., 2014). Learners' behaviours in the online learning process depend a great deal on the quantity as well as the quality of instructors' guidance and feedback. In terms of quantity of interaction, learners naturally react positively to attentive instructors. Instructor's online presence could be an important factor to increase learner online presence and make them motivated and satisfied with the online learning environment (Kang & Im, 2013). In this regard, study by Gómez-Rey, Barbera & Fernández-Navarro (2017) found that instructors' pedagogy is considered the most important role, followed by being a designer, social and promoter, which include sending messages to learners to promote learning.

In developing countries, where college students' autonomy is still low, and students are used to being told what to do (Le, 2013; Loi, 2016), the role of instructors is even more important. Technical and cultural barriers also make learners' interaction with their instructors more limited. For example, in Vietnam, although Internet coverage for the whole population has increased year on year, learners who come from the countryside and stay in the university dormitory may have fewer advantages than those who live at home with their families and have broadband connection. From the cultural perspective, Asian learners view their teachers as a respectable authority, a role model and an ultimate source of knowledge in their field (Loi, 2016). Accordingly, they are reluctant to argue with instructors, ask questions for clarification, or share different views about academic matters (Raymond & Choon, 2017).

1.3 Learner–Learner Interaction

The third type of online interaction is among learners themselves, which can be in one-to-one or one-to-many format. Interaction with peers gives learners strong motivation to excel through mutual collaboration and moderation for learning (Ghadirian, Ayub & Salehi, 2017). Some studies have shown that learner–learner interaction has a positive impact on learners' satisfaction in online learning environments (Eneau & Develotte, 2012). However, studies by Gameel (2017) and Kuo et al. (2014) revealed the opposite results: learner-learner interaction was not a significantly associated with student satisfaction. This type of interaction needs to be meaningful in order to avoid the feelings of isolation, alienation disconnection and being superficial, which may cause negative effects on learners' participation (Kim, 2017).

In short, past studies have shown that in an online learning environment key factors that contributed to student satisfaction could be categorized into those relating to learner interaction with peers, instructors and course content. Is this true during the special period of COVID-19 in a developing country like Vietnam? The aim of this study is to investigate learners' satisfaction with online learning delivered at a university in Vietnam. The study was conducted through an online survey with over 3000 learners who were forced to study online due to the outbreak of COVID-19.

2. Materials and Methods

2.1 Participants and Online Courses

Participants were over 3,000 undergraduate students of a Vietnamese university. They were divided into two groups of those who learnt foreign languages like English, Chinese, Japanese, and those who studied other subjects such as business administration, information technology, banking and finance through the media of English and French. They started learning online when Vietnam had to ban large gathering of people from the end of February and exercised social distancing from the 1st to 23rd of April, 2020. Figure 1 presents the information about the participants of the study.

Data from Figure 1 shows that the majority of participants were female, accounting for over 90%. This was the common situation in foreign language universities in Vietnam where female students often outnumbered male ones. The number of language participants were also doubled that of non-language major ones (66.3% versus 33.7%). This was due to a bigger number of language faculties (10) than non-language ones (3). The Figure also depicts the participants' experience of online learning. Interestingly, before the Pandemic outbreak, the majority of participants (73%) had not experienced online learning, and only 27% had. When they had to study online, using home wifi was the most common way to connect to the Internet, followed by mobile data (3G or 4G) and other methods. Most of them also used laptop and smartphone for online learning. The connection was also stable or very stable (accounting for nearly 70% in total); however, still one third of the students experienced unstable connections.

The students had online lessons for all courses of language practice, interpreting and translation (for language major students) and specialized courses (for non-language major students) with the exception of physical education. The online courses were designed with the principle of maximizing interaction, not only between the instructors and learners but also among the learners who were requested to use the institutional email accounts for their teaching and learning. These accounts were associated with G-Suite for Education, a

package that includes Google's main components for online classroom, collaboration, and communication. As mentioned earlier, before rolling out the courses, all the teachers were trained on using the applications (Zoom and G-suite) in general and imbedded communication tools in particular; for example, how to create break-out room, record lessons and even setting up social networks for out of live sessions.

In terms of instructor-learner interaction, many tools were used to support synchronous and asynchronous learning activities by textual and audio-visual tools in G-Suite. These tools allowed the teachers and students to interact before, during and after the live sessions. For example, the teachers granted access to the shared materials in Google Drive, then students followed the instructions to prepare for the upcoming lessons. The teachers also scheduled live sessions in Meet or Zoom, shared the events in Google Calendar and in the Stream section of the Google Classroom, and sent reminders to the students. During the live session, the teachers were encouraged to record their lectures and store the recordings in Google Drive for absent students to watch asynchronously. Some teachers used Zoom for their live sessions because the breakout room function allowed them to divide the class into different groups for discussion. Other teachers preferred Google Meet because it was already included in G-Suite. After live sessions, Google Classroom helped the teachers communicate with students, distribute course materials, set and collect assignments, as well as grade their work. Google Forms were also used substantially by the teachers to set quizzes and collect information from the students.

Regarding learner-learner interaction, students were involved in many activities both synchronously and asynchronously. For example, they concurrently worked on a project in a shared document while giving and receiving peer feedback. During their collaboration, the students often exchanged ideas in Google Docs in form of comments, chatted in Hangouts, or discussed on Meet or Zoom if they wanted to share screen at the same time. Another example was when students worked together to conduct a survey via Google Forms, used Google Sheets for data analysis, and then presented their findings using Google Slides. These collaborative activities were done while students maintained their communication via chat, comments, or teleconference tools.

2.2 Instruments, Data Collection and Data Analysis

At the university where this study was conducted, online lessons were delivered from the end of February to the end of May 2020. However, online teaching and learning continued after the lift of social distancing. The teachers and students either went to their offices or stayed at home and continued to deliver and access online lessons via Zoom or G-suite applications. They also made use of online chat tools, such as Zalo and Facebook, for synchronous and asynchronous interaction. Similar to the country's situation, while the university in this study has developed an LMS for some disciplines like English language studies, IT, business management, etc., the delivery of online lessons during this period relied mainly on the utilization of video conferencing applications (mostly Zoom and G-suite).

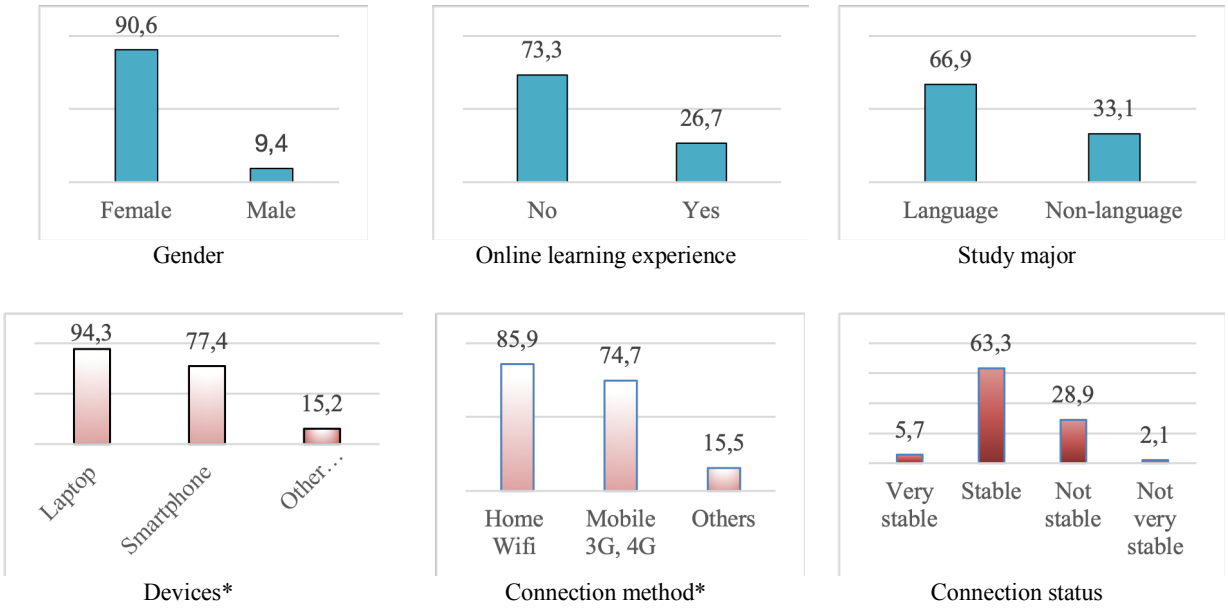

Figure 1 - Participants' profile.
** participants could choose more than one device or connection method*

In this study, the researchers adapted the survey instruments based on the prior literature (Kuo et al., 2014; Moore, 1989) which included, among other things, factors that would influence learners' satisfaction in online learning. The interaction and satisfaction subscales were revised to fit the fully online environments of this study and translated into Vietnamese. Each interaction subscale had 8 items and the satisfaction one had 4 items. The survey also included an open-ended question which aimed to collect learners' additional comments about the online study during the emergency learning.

The biggest modification to the questionnaire was in the number of points in the Likert scale. In this study, 4-point Likert-scale was used to measure learner levels of interaction and satisfaction. Standard surveys often use 5-point or 7-point Likert scales; however, there are certain drawbacks associated with the use of midpoint in Asian context. Past studies have shown that Asian students tended to choose the middle option (e.g. neither agree or disagree) in order to avoid conflict (Lee, Jones & Mineyama, 2002; Wang, Hempton, Dugan, & Komives, 2008).

Two stages were involved in the instrument development process. Stage 1: To ensure the content validity of the instrument, an expert judgement session was organized. Eight teachers, who were involved in online teaching during the COVID-19 period were invited to read the questions. They were asked to comment whether the questions were appropriate for this study. Slight modifications such as item deletion, addition and wording changes were made to assure the suitability of the questions. Stage 2: The questionnaire was piloted on 80 students who were learning online at the time. These students were later on excluded from the participants list. The Cronbach's coefficient alpha values, calculated based on the pilot sample of this study, indicated that the developed instruments were reliable (0.93).

After the pilot, the survey was hosted in Google Forms. The survey links were distributed, via email and some alternative means, to all the students. To increase the response rate, follow-up emails were sent to students as a reminder. To improve reliability, data cleaning was also conducted by removing corrupted, incorrectly formatted, duplicate, or incomplete data within the dataset. For some reasons, there were many invalid responses. For example, there were cases where participants selected one scale (usually the highest one) for most items in the questionnaire. Altogether about one fourth of the responses were removed, and only 2,279 responses were retained for analysis, accounting for 75% of the total.

The quantitative data were analysed using both simple descriptive and inferential statistics with the help of Statistical Package for Social Sciences (SPSS), version 22 (Pallant, 2011). Descriptive analyses were conducted to present the participant basic information and inferential analysis was performed to investigate factors that influenced learners' satisfaction. Qualitative data (students' answer to the open-ended question) were processed using content analysis (Miles, Huberman & Saldaña, 2014). A triangulation technique (Teddlie & Tashakkori, 2009) was adopted in the analysis of data in which the quantitative results were supported and/or explained by findings from the qualitative data.

3. Results

3.1 Hypothesis Testing

In order to test the aforementioned three hypotheses of the study, we conducted three inferential analyses, namely principal component analysis (PCA), Pearson correlation and multiple regression. These results are then confirmed by a qualitative analysis of participants' answers in the open-ended part of the questionnaire.

Principal component analysis

Before finding the correlation between three groups of factors (learner-content, learner-learner and learner instructor interaction) and learners' satisfaction, we conducted a principal component analysis (PCA). The 24 items on interaction that were supposed to influence the students' satisfaction were subjected to this analysis. Prior to performing the PCA, the suitability of data for factor analysis was assessed. Inspection of the correlation matrix revealed the presence of 17 items with coefficients of 0.3 and above. The Kaiser-Meyer-Olkin (KMO) value was 0.92, exceeding the recommended value of 0.6, and the Bartlet's Test of Sphericity indicated statistical significance, supporting the factorability of the correlation matrix ($p < 0.01$).

In the PCA, eigenvalue cut-off of 1.0 was specified and the results show that 20 questions produce 5 components, which is higher than the three proposed variables. Learner-learner interaction construct was devided into two components and learner-content interaction was divided into two sub-groups of the interaction itself and the course content or materials. The total variance explained by the 5 components solution is 60.68%, which exceeded the minimum threshold of 50% variance explained. The five items on learner-learner construct were related to their answers and feedback to peers, proactiveness in the interaction and peers' feedback to their opinions. Items on learner-instructor interaction were timeliness, usefulness, proactiveness and fullness of instructors' responses to the learners. In terms of interaction with content, the items were related to their preparation before the lessons, proactiveness in the interaction with the course content, completion of online exercises and full attendance of online lessons. Regarding the course content, the items were related to its usefulness in enhancing their theoretical knowledge and skills as well the suitability of the design of the course materials and online lessons. The factor loadings for all factors

ranged from 0.43 to 0.84, exceeding the threshold of 0.3.

Pearson Correlation Analysis

Table 2 shows the Pearson correlation coefficients among the variables (20 items). All three types of interaction were positively related to satisfaction ($p < 0.01$).

Learner-content interaction had the strongest correlation with student satisfaction ($r = 0.676$), followed by learner-instructor and learner-learner interactions respectively (0.597 and 0.489, respectively). All the relationships were of moderate level (Hair, Celsi, Money, Samuoel, & Page, 2011). Based on the results of Pearson correlation analysis, we can summarize the 3 hypotheses statements in this research in Table 3.

Multiple Regression Analysis

Multiple regression analysis was performed to see how much the independent variables could predict student satisfaction. Preliminary analyses were conducted to ensure no violation of the assumptions of normality, linearity, multicollinearity and homoscedasticity (Pallant, 2011). After the entry of the three variables (components), the total variance explained by the model (adjusted R square) was 0.55, which indicated that the model explained 55 per cent of the variance in perceived satisfaction.

Table 4 shows that learner-learner interaction ($t = 11.91$), learner-instructor ($t = 15.20$), learner-content interaction ($t = 23.90$) were significant predictors in explaining student satisfaction ($p < 0.001$). Comparing the contribution of each independent variable, it is shown in Table 4 that when the variance explained by all other variables in the model was controlled for, learner-content interaction made the strongest contribution to explaining the satisfaction ($ß = 0.43$). Beta values for two other variables (learner-instructor and learner-learner interactions) indicated relatively similar contributions (0.19 and 0.27 respectively).

3.2 Confirmation of Quantitative Results

As mentioned earlier, in order to confirm and compliment the above findings, we analysed the qualitative data which came from the participants' answers to an open-ended question at the end of the survey questionnaire. Around two thirds of participants expressed their opinion about different aspects of online learning. We grouped these opinions into those related to the aforementioned results of quantitative analysis and also those concerning their experiences about online learning during COVID-19 period.

The quantitative data analysis indicated that learners' interaction with content was the strongest predictor of students' satisfaction. The specific items included effectiveness, quality, design of online materials and learners' proactiveness in their interaction with it. In terms of online materials, due to the emergency of the lessons, most instructors prepared PowerPoint slides and presented them directly in the lessons or pre-recorded the lessons and broadcast them for the students to watch. The instructors then designed exercises in form of big assignments, case studies, multiple-choice practice for the students to work individually, in pairs or groups. In the answers to the open-ended questions, many participants viewed that the online contents should be more appropriately designed or shortened to produce interesting lessons.

I am aware that it takes more time and efforts to design online lessons. However, I want course materials to be better designed so as to fit with the online class length (ID 2091).

Instructors should record lessons and upload for students to watch in advance in order to increase understanding and re-watch if necessary (ID 1497).

In short, the course content in general and learners' interaction with it received a lot of attention from the learners. This seems to indicate that they did care about the quality of the course content, materials and how these were delivered in an online environment.

The results of quantitative analysis revealed that interaction with peers and instructors were also significant predictors of student satisfaction, despite at lower levels. Nonetheless, in their answers to the open questions, the participants had different views on this issue. While some claimed that *'the online learning saved time and cost, however, interaction was not effective*"(ID 1356); some others commented that *"online learning is very effective and interaction with the instructors is easy"* (ID 1544) or "*Instructors provide a lot of real examples, which helps learners easily understand the lessons"* (ID 1326). Followings were some of other comments on interaction during the online study period.

There was no interaction in online learning like this, especially for writing course. It took the instructors a lot of time to answer my question because of unstable Zoom (ID 2412).

I do not want to learn online in the future because in language learning, it is necessary to have face-to-face interaction with instructors and peers for learning effectiveness (ID 304).

The applications allowed students to enter chat rooms and work in pairs or groups. However, due to a number of reasons, this interaction was still limited and many participants wanted to see more online interaction.

I hope instructors will design more questions for learners to discuss and interact during the lesson (ID 2532).

I am really disappointed in the use of the applications because they were not effective for groupwork, which led to less interaction among the students (ID 2290).

There was a common sense among the participants that instructors play a very important role in promoting online interaction through applying effective teaching pedagogy.

Table 1 - Rotated factor loadings for constructs.

Rotated Pattern Matrix					
	Component				
	1	2	3	4	5
1. I usually gave feedback to peers' opinion.					0.804
2. I usually answer peers' questions.					0.835
3. Peers often responded to my opinions.		0.637			
4. I was proactive in interaction with peers.		0.755			
5. I usually work with peers to do assignments.		0.787			
6. My peers were proactive in interaction with me.		0.799			
7. I used different tools to interaction with peers.	0.429				
8. Instructors often posted questions on forum for discussion.	0.565				
9. I received full answers from instructors when necessary.	0.713				
10. Instructors' answers were useful to me.	0.757				
11. Instructors proactively interacted with me.	0.758				
12. Instructors responded to my questions in a timely manner.	0.824				
13. I proactively interacted with online materials.			0.622		
14. I read the materials before online lessons.			0.671		
15. I fully attended online lessons.			0.675		
16. I completed exercises as requested by the instructors.			0.728		
17. The lesson content helped me enhance theoretical knowledge.				-0.654	
18. The lesson content help improve my practical skills.				-0.678	
19. The materials were suitably designed for online learning.				-0.825	
20. The lesson content was suitably designed for online learning.				-0.839	

Table 2 - Correlation between variables.

Interaction	1	2	3	4
1. Learner-learner	1	0.390**	0.446**	0.489**
2. Learner-instructor		1	0.585**	0.597**
3. Learner-content			1	0.676**
4. Satisfaction				1
**. Correlation is significant at the 0.01 level (2-tailed).				

Table 3 - Hypothesis testing.

Hypotheses	Correlation coefficient	Conclusion*
H1: Learner-learner interaction is positively related to learning satisfaction.	0.489	Supported: Moderate relationship
H2: Learner-instructor interaction is positively related to learning satisfaction.	0.597	Supported: Moderate relationship
H3: Learner-content interaction is positively related to learning satisfaction.	0.676	Supported: Moderate relationship

Table 4 - Multiple regression of three predictors of student satisfaction.

	Coefficient	t	Sig.	Tolerance	VIF
(Constant)		-4.567	0.000		
Learner-learner	0.191	11.907	0.000	0.776	1.289
Learner-instructor	0.269	15.197	0.000	0.637	1.569
Learner-content	0.434	23.896	0.000	0.602	1.661
Adjusted R squared: 0.55					

Many instructors do not have suitable online teaching pedagogy. Hence, the lessons became difficult to grasp. I hope instructors will change their pedagogy (ID 134).

I want the university and instructors to have more effective pedagogy and to reduce pressure on the students (ID 2564).

In short, the participants' written comments partially supported findings of the quantitative results, which further consolidate the importance of interaction in online teaching and learning. The comments also demonstrated that due to the emergency of online teaching, the instructors did not seem to prepare well for the live lessons and learners wanted to see higher quality course content and more interaction with peers and instructors.

4. Discussion and Conclusions

This study aimed to explore factors that influenced online learning satisfaction at a large university in Vietnam. The combined analyses of quantitative and qualitative data sets indicated that course content, interaction and instructors' online teaching pedagogy were three groups of factors affecting online learners. The results of this study will now be compared to the findings of previous works.

In this study, the PCA results were consistent with previous research on the factors influencing satisfaction in online learning, with learner-instructor related items loading strongly on Component 1, learner-learner items loading strongly on Components 2 and 5, and course-related item loadings strongly on Components 3 and 4 (learner-content interaction). The Cronbach alpha values for all the retained items were over .70, which suggests acceptable internal consistency among the items (DeVellis, 2003).

Correlation and multiple regression analyses indicated that learners' interaction with content, peers and instructors were all positively related and significant predictors of student satisfaction. The results indicated that all hypotheses H1, H2, and H3 were supported. First, the fact that learner-content interaction was the strongest predictors and received a lot of written comments from the participants indicated that content of an online course should be appropriately designed and delivered for optimal effectiveness of interaction. This result is consistent with previous studies (Goh, Leong, Kasmin, Hii & Tan, 2017; Kou et al., 2014).

To promote learning-content interaction, firstly, the quality of the course content has to meet learner expectation. One of the key elements of course content is the design, which had proven important in student satisfaction (Chen & Yao, 2016; Zaili et al., 2019). Due to the emergency of online teaching and learning during the COVID-19 Pandemic, not all instructors and learners were prepared well academically for an online teaching and learning environment. Hence, the interaction did not occur as they had expected. In addition, the migration of traditional teaching method to online one needs more efforts from the instructors and supports from educational institutions.

Both learner-instructor and learner-learner interactions were significant predictors for student satisfaction but the contribution was relatively small (beta of 0.24 and 0.23, respectively). Although this finding seemed to be consistent with some research (Shen, Cho, Tsai, & Marra, 2013), they differed from other published studies (Gameel, 2017; Kuo, et al., 2014). The small contribution of these two types of interaction could be explained by the fact that the interactions mostly occurred during the online lessons. In addition, learners might have viewed that in learning language and other subjects through media of languages, interpersonal interaction did not help much in improving their language competence.

In order to increase learner-instructor interaction, instructors play a crucial role, especially in providing pedagogical instructions, using different types of interactional matrices, technological tools, and learning analytics (Chen & Yao, 2018; Cox et al., 2015; Gómez-Rey, et al., 2017). In language learning, providing valuable in-text written, audio, personalized or holistic feedback to both individuals and groups of learners would make them feel the interaction more meaningful (Cox et al., 2015; Kim, 2017). In other words, the instructors' messages should be of high quality and useful to attract learners' desire to interact (Ghadirian, et al., 2017; Gómez-Rey et al., 2017). This combination of findings provides some support for the conceptual premise that it is necessary to provide instructors with necessary pedagogical, social, and technical skills in online teaching (Yükselir, 2016). It is also worth mentioning that in Asian culture, learners view their teachers as a respectable authority, a role model and an ultimate source of knowledge (Loi, 2014; Raymond & Choon, 2017).

In short, the study results show that online interactions with content, instructors and peers were significant predictors of student satisfaction. However, in order to have meaningful online interaction, a lot more efforts are needed, especially training on pedagogy for instructors. In an Asian context where students are passive and tend to rely on their teachers, these findings are meaningful, suggesting that more attention should be paid to pedagogical training of online teachers, who should not only be equipped with knowledge and skills in online content design, lesson delivery but also with facilitation and promottion of online social interaction (Gómez-Rey et al., 2017).

There are a number of other important implications from this study. First, it has gone some way towards enhancing our understanding of student satisfaction in online learning. It confirms previous findings and contributes additional evidence which suggests the need to pay a close attention to the course content (e.g. design, usefulness of interaction, flexibility of delivery), instructors (e.g. pedagogy), and learners (e.g.

proactiveness). Second, whilst this study did not confirm the role of Internet self-efficacy, it did partially substantiate the need to conduct careful hands-on orientations for both learners and instructors before the delivery of an online course and to provide continuous technical support during the course implementation. In short, the combination between academic and technical experts is strongly recommended to ensure quality of course materials on one hand and design and ease of use on the other hand. These factors are important in promoting student satisfaction with an online course.

The findings in this study are subject to at least three limitations. First, these data applied only to the learners' perceptions about the online course. In order to get a fuller picture of learner interaction with course content, peers and instructors, future studies should include factual data on grades, time-on-task and online messages to increase validity. Second, the study was conducted at only one university in Vietnam, thus the findings might not be transferable to other online teaching and learning contexts. Third, the study did not conduct a survey with the instructors, who should play the role of content facilitators, designers, social interaction and even life skills promoters (Gómez-Rey et al., 2017). Future research should therefore concentrate on the investigation of instructor perceptions about their experience in online supervision and other related factors in different online teaching and learning contexts.

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