A Quantitative Research on Students' Satisfaction with Blended Learning in the COVID_19 Pandemic Situation

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Abstract

Blended learning has been implemented in UEH since 2016. Previous studies and empirical evidence have demonstrated that this method of learning is a successful approach in terms of the benefits it provides to both educators and learners. However, amidst the COVID-19 pandemic, it is truly difficult for UEH to continue applying successfully blended learning in combination with mandatory distance learning. Student satisfaction has always been a criterion for evaluating an educator's success; additionally, it has been linked to student academic performance and development. As a result, the purposes of this study are to assess student satisfaction with blended learning among Business English majors in UEH and to explore the variables that affect student satisfaction. In detail, an approach in quantitative method was chosen for the data collection and analysis. A conceptual model was created, as well as a questionnaire. The hypotheses were tested using exploratory factor analysis and linear regression with a sample of 104 participants. According to the findings, students are mostly satisfied with blended learning during the COVID-19 pandemic. Furthermore, student satisfaction is positively influenced by technology quality, educator presence, course organization, and interaction, with technology quality and educator presence being major factors.

***Keywords**:* students' satisfaction, emergency remote learning, blended learning

LIST OF ABBREVIATIONS

COVID-19	:	Coronavirus Disease of 2019
ERT	:	Emergency Remote Teaching
UEH	:	University of Economics Ho Chi Minh City
LMS	:	Learning Management System

Introduction

Background

The COVID-19 pandemic has turned the world into chaos as it leaves severe impacts on nearly every facet of life. Because of COVID-19, many governments around the world have implemented social-distancing policies in the hopes of reducing virus transmission. As a result, schools and other educational facilities have to close down. Classes at all levels move from traditional face-to-face education to distance-learning environments. The situation also applies to the Vietnamese educational system, as the Ministry of Education and Training has demanded schools to shift to a new mode of teaching and learning, relying on online education instead of traditional classroom instruction. As a response to the pandemic, ERT was formed. For the first time in history, all students are compelled to take all of their lessons online, as are all teachers. This abrupt change has resulted in a slew of unexpected and unusual issues for teachers, students, and parents.

Despite the rising popularity of ERT, e-learning is not a new pedagogical method in Vietnam, particularly at the tertiary level. The Ministry of Education and Training of Vietnam issued Circular No.12/2016/TT-BGDĐT in 2016 that regulating the application of information technology in the management and organization of online training. Since there, various learning methods and blended learning have been promoted and integrated into the educational systems of many universities and colleges as a result of technological advancements, using web-based platforms and learning management systems (e.g., Moodle, Blackboard). Currently, in UEH, the school has also established an e-learning management system to support the blended learning method since 2016. In particular, each subject specifies which content can be learned online and which content must be learned in person with the teacher. The school has used the school's LMS system, together with other online platforms (e.g., Google Meet, Microsoft Team, Zoom) to provide lessons to learners. This method of online teaching can effectively deal with the context of social distance, which requires the teachers as well as the school to utilize effectively the online teaching method.

Research problem

The use of blended learning in higher education unquestionably correlates to the present educational change. Blended learning has also been shown to help both teachers and students in a number of studies. According to Jokinen and Mikkonen (2013), although instructors may encounter certain technical difficulties, they think that utilizing electronic techniques enhances students' performance by giving them additional possibilities. López-Pérez et al. (2011) further argue that students may generate a positive attitude towards a blended learning environment due to the high degree of usefulness, motivation, and satisfaction it provides. Other benefits of blended learning include increased flexibility (Macedo-Rouet et al., 2009), cost reductions (Vernadakis et al., 2011), and an increase in student engagement, interaction, critical thinking, and information retention (Sajid et al., 2016) when compared to traditional classes. In the context of pandemic social distancing, the sudden and abrupt transition of traditional classes to virtual ones may leave students unpleased or unsatisfied when experiencing e-learning during the pandemic. Loh et al. (2016), for example, found negative student comments regarding the lack of promoting teamwork, lack of interaction between people, and self-motivation problems when learning online. In terms of perceived satisfaction, social connections, and presence, Bali and Liu (2018) found that face-to-face education exceeded e-learning. According to the findings of a study conducted in Vietnam, students have mixed feelings about fully online learning as a situational solution to the pandemic (Phan et al., 2020).

To address the significance of blended learning, Garrison and Vaughan (2008) argue that blended learning has fulfilled the demands of the twenty-first century while still satisfying the needs of traditional education. According to McQuillan (2010), student satisfaction is an essential element in program completion and a measure of an educational program's quality. Later in a study, Karim et al. (2021) discover that student satisfaction promotes self-esteem, which contributes to the growth of confidence, the acquisition of new skills, and the acquisition of knowledge in a pleasant routine. Pike (1993) explains this by demonstrating a positive relationship between student satisfaction and academic performance. However, given that distance learning is required, student satisfaction with blended learning during the COVID-19

pandemic has to be studied further. As a consequence, undertaking research on student satisfaction is necessary in order to determine whether colleges and universities are accomplishing their mission.

Until recently, several researchers have looked into the factors that may predict student satisfaction in the context of remote learning settings (Alqurashi, 2019; Bray et al., 2008; Kuo et al., 2014). During COVID-19, one notable study investigated the factors influencing student satisfaction with emergency remote learning in higher education (Ho et al., 2021). Other studies focus more on evaluating student satisfaction with online learning during the COVID-19 pandemic (Almusharraf & Khahro, 2020; Fuchs & Karrila, 2021). In Vietnam, there are studies about the student's perspective of ERT due to the COVID-19 pandemic (Le & Truong, 2021; Phan et al., 2020). Many universities in Vietnam have also undertaken studies in the middle of COVID-19 in order to enhance the quality of training and education (Nguyen & Doan, 2021; Pham et al., 2021).

Significance of the research

It suffices to say that research plays a role in education. To be more specific, the findings of the study will inform the university as to whether students are satisfied with the blended learning mode during the COVID-10 pandemic. Furthermore, the results indicate possible strategies for the university to enhance student satisfaction and strengthen its e-learning impact. In other words, the results of the research will help the university recognize the importance of technological adaptations in teaching and developing appropriate policies to train and upgrade instructors' teaching capabilities.

Research objectives and research questions

This study attempts to assess the student satisfaction levels on the blended learning method, and e-learning during COVID -19 pandemic. Furthermore, this research also seeks to identify the potential factors that influence student satisfaction with e-learning. In detail, given the aforementioned objectives, the study is directed by the following research questions:

- What is the level of satisfaction by the students with regards to the utilized blended learning mode during COVID-19 pandemic remote teaching?

- What are the factors influencing student satisfaction with regards to the utilized blended learning mode during COVID-19 pandemic remote teaching?

Literature Review

Blended learning

Blended learning is a phrase that is widely used amongst scholars and practitioners. As a result, there exist several inconsistent definitions. One of the most used definitions of blended learning is introduced by Garrison and Kanuka (2004). In a study, they define blended learning as an experience of both classroom-based learning and online learning integrated deliberately. Another popular definition is suggested by Graham (2006), in which he describes a blended learning system as a combination of face-to-face and computer-assisted teaching. Allen and Seaman (2010) offer a more brief version, stating that a blended course blends both the delivery of face-to-face and online learning. However, they further emphasize that face-to-face delivery is

substantially reduced in a blended course since a large percentage of material is provided online (e.g. up to 79 percent), with the utilizing of online discussion forums. In a later study, Ossiannilsson (2018) details the blended learning theme as a mix of digital media, online virtual platforms, and conventional face-to-face teaching with an instructor-led approach in a classroom environment.

It seems that so far the term blended learning has always included the factors "face-to-face learning", "traditional learning/experiences" and other e-learning dependents. However, naturally, blended learning could come with many different approaches. The approaches to blended learning identified by Driscoll (2002) can be summarized as the utilization of web-based technology to achieve educational goals, the combination of different instructional methods to accomplish an ideal learning result, the combination of any form of technology in teaching with instructor-led teaching, and the combination of any form of technology in teaching with classroom-based teaching. Graham, Allen, and Ure (2005) later have a similar idea to Driscoll when they describe blended learning as a broad dimension including three main combinations between different instructional methods, between different modes of media delivery, and between face-to-face and computer-assisted intervention. As per Oliver and Trigwell (2005), the word blended learning basically refers to the mixing of two or more distinct types of things, such as ranging from methods, media, contexts, learning theories, learning objectives, and pedagogics. To sum up, Driscoll (2002) comments that blended learning can imply various things to different people, showing that it possesses a largely unexplored potential.

Despite the popularity of blended learning, there is still some confusion regarding what the phrase means when it is used. It signifies different things to different people, as previously said, demonstrating its largely unexplored potential. In this study, the definition of Boelens et al. (2015) is chosen. Regarding blended learning, they exempt any learning that occurs purely online or solely in classroom-based educational contexts, taking consider only learning takes place in an educational environment that employs a planned mix of online and classroom-based interventions as learning initiation and support. While the most popular understanding of blended learning is that it mixes online and offline learning, it's also crucial to consider the context of mandated online learning during a pandemic. The offline learning terms such as "face-to-face learning" and "traditional learning" are replaced with "classroom-based interventions" in the chosen definition. This is a necessary change, highlighting that "classroom-based interventions" do not require a physical environment but extend beyond that physical boundary.

Hypotheses on factors influencing student satisfaction

Technology quality

H1: Technology quality will positively influence student satisfaction in the blended learning context during the COVID-19 pandemic.

Educator presence

H2: Educator presence will positively influence student satisfaction in the blended learning context during the COVID-19 pandemic.

Course Organization

H3: Course organization will positively influence student satisfaction in the blended learning context during the COVID-19 pandemic.

Interaction

H4: Interaction will positively influence student satisfaction in the blended learning context during the COVID-19 pandemic.

Student's self-efficacy

H5: Student's self-efficacy will positively influence student satisfaction in the blended learning context during the COVID-19 pandemic.

Research model

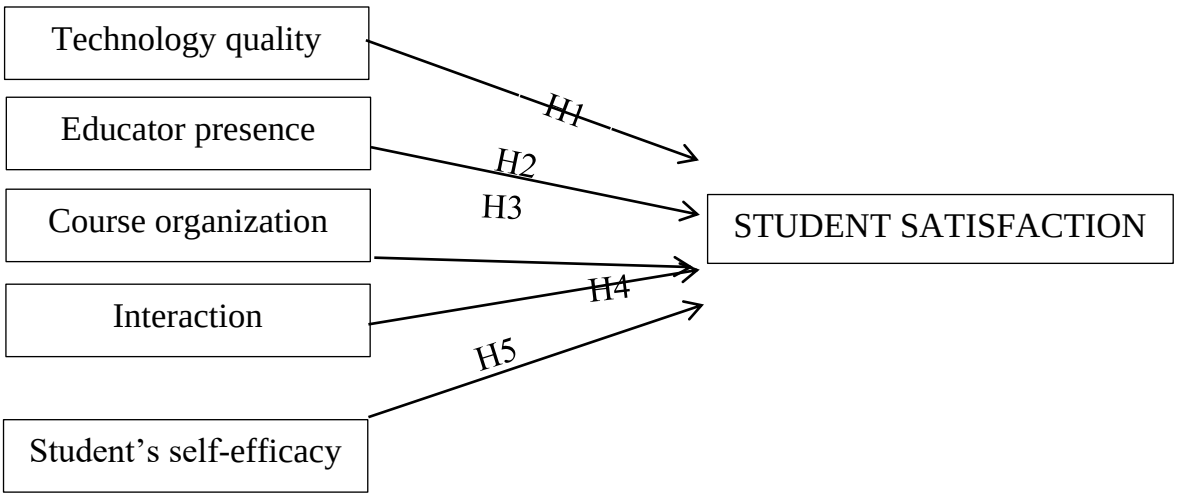

***Figure 2.3*: Model of factors of student satisfaction in blended learning.**

Methodology

Method

Within the scope of the study, the quantitative research technique is chosen, in which a survey is created to administrate selected subjects. The aim of the survey instrument is to gather data on the key variables that affect student satisfaction with blended learning during the COVID-19 pandemic. Additionally, statistical and analytical techniques utilizing regression and will be used to gather, analyze data, and test hypotheses.

Research instruments and measurement

A questionnaire developed by the researcher is used to explore the perceptions of university students with blended learning during the COVID-19 pandemic, concerning the mandatory aspect of distance learning. The items in the questionnaire were adopted based on the extant

literature with some modifications to be suitable to the study. Technology quality is measured by six items which take references from scales developed by Eom (2012), Cidral et al. (2018), and Nguyen (2021). Educator presence and course organization are respectively metered by five items, and four items that take references from a scale developed by Gray & DiLoreto (2016). Interaction is measured by seven items which take references from scales developed by Gray & DiLoreto (2016), and Kuo (2014). Student's self-efficacy is measured by six items from which take references scales developed by Eom (2012), and Bao et al. (2013). Student satisfaction is measured by six items which take references from a scale developed by Gray & DiLoreto (2016). The scale measurements are detailed in Table 3.2.1. (Appendices)

According to the above-mentioned information, technology quality, educator presence, course organization, interaction, student's self-efficacy, and student satisfaction have a total of 34 items. All items are measured by a five-point Likert scale, anchored by 1-strongly disagree and 5-strongly agree.

The survey form has three sections in total. The first section conveys information about the research subject, the definition of related terms, the voluntary characteristic of the research, and the meaning of the study. The second includes 34 measurement items. The final section concerns some personal information of the answerers, using for demographics analysis and answer validation. All of the information and instructions are demonstrated in both English and Vietnamese including the measurement items to increase the response rate.

Population and sample

In this research, the populations are the students majoring in Business English in UEH. A convenience sample of students is selected because it is simple to obtain and requires little work on the researcher's side. Even when faced with difficulties, convenience sampling enables the researcher to collect data.

The survey is created with Google Forms and distributed online via the social media platform Facebook, in the targeted group of students majoring in Business English in UEH. In total, 116 answers are received, 12 answers are excluded because of duplication, incompletion, and scope violation, and 104 answers are used in the statistical analysis.

Data analysis method

As regards the data analysis, it includes some steps. The initial descriptive analysis is conducted to provide information about the demographic respondents. Then, coefficients of Cronbach's Alpha are applied to test for reliability. Next, Exploratory Factor Analysis (EFA) showing an association between several items and constructs run in the process. After that, the multicollinearity existence test is examined. The next step is performing regression analyses to test the relationship between the whole set of predictors and dependent variables in the study. After that, hypothesis testing is conducted to determine whether the proposed hypotheses were supported or not. The results of the data analysis are used for discussion and further implications.

Results

Data statistical analysis

Table 1. Gender

Valid Percent	Cumulative Percent
28.8	28.8
71.2	100.0
100.0	

According to the gender table 1, in 104 respondents, there are 30 males, equivalent to 28.8%. In comparison with males, the number of females is 74, accounting for a much larger percentage, 71.2%. The gender ratio of collected samples coincides with the gender ratio of the students majoring in Business English, where female students significantly outnumber male students (see table 4.1.1, Appendix A).

Table 2. Study year

Percent	Valid Percent	Cumulative Percent
31.7	31.7	31.7
37.5	37.5	69.2
30.8	30.8	100.0
100.0	100.0	

In the study year table 2., most of the respondents are sophomores, accounting for 37.5% (equivalent to 39 students). Following up are the freshmen, and the third-year students, which respectively account for 31.7% (equivalent to 33 students) and 30.8% (equivalent to 32 students). As shown, three groups account for nearly the same percentage. The difference in amount between groups of study year is insignificant, stating that the samples are evenly collected from the freshman, sophomore, and third-year students.

Table 3. Frequency of answers

Items	**Valid 1 (%)**	**Valid 2 (%)**	**Valid 3 (%)**	**Valid 4 (%)**	**Valid 5 (%)**	**Mean**	**Std. Deviation**
TQ1	0.00	0.96	20.19	55.77	23.08	4.01	0.690
TQ2	0.96	2.88	24.04	52.88	19.23	3.87	0.789
TQ3	0.00	2.88	20.19	53.85	23.08	3.97	0.743
TQ4	0.00	0.00	20.19	54.81	25.00	4.05	0.674
TQ5	0.00	1.92	20.19	53.85	24.04	4.00	0.724
TQ6	0.96	1.92	19.23	52.88	25.00	3.99	0.782
EP1	0.96	8.65	24.04	43.27	23.08	3.79	0.931
EP2	0.00	2.88	27.88	44.23	25.00	3.91	0.802
EP3	0.96	6.73	30.77	40.38	21.15	3.74	0.903

EP4	0.96	7.69	36.54	38.46	16.35	3.62	0.885
EP5	0.00	5.77	23.08	48.08	23.08	3.88	0.828
CO1	0.96	2.88	17.31	57.69	21.15	3.95	0.768
CO2	1.92	3.85	17.31	58.65	18.27	3.88	0.821
CO3	0.96	3.85	15.38	55.77	24.04	3.98	0.800
CO4	0.96	4.81	27.88	48.08	18.27	3.78	0.836
IL1	0.00	6.73	41.35	36.54	15.38	3.61	0.829
IL2	0.00	6.73	20.19	40.38	32.69	3.99	0.898
IL3	1.92	5.77	25.96	45.19	21.15	3.78	0.913
IL4	3.85	16.35	27.88	37.50	14.42	3.42	1.049
IL5	0.00	4.81	27.88	42.31	25.00	3.88	0.844
IL6	1.92	3.85	31.73	43.27	19.23	3.74	0.881
IL7	0.96	1.92	21.15	44.23	31.73	4.04	0.835
SE1	0.00	1.92	25.00	51.92	21.15	3.92	0.733
SE2	0.00	2.88	24.04	44.23	28.85	3.99	0.806
SE3	0.00	1.92	33.65	42.31	22.12	3.85	0.785
SE4	0.00	0.00	21.15	49.04	29.81	4.09	0.712
SE5	0.00	3.85	30.77	50.96	14.42	3.76	0.744
SE6	0.96	5.77	27.88	47.12	18.27	3.76	0.853
SS1	0.00	5.77	16.35	57.69	20.19	3.92	0.772
SS2	0.00	5.77	22.12	53.85	18.27	3.85	0.785
SS3	0.00	3.85	14.42	59.62	22.12	4.00	0.724
SS4	1.92	0.00	22.12	53.85	22.12	3.94	0.786
SS5	1.92	3.85	34.62	47.12	12.50	3.64	0.823
SS6	0.00	5.77	21.15	53.85	19.23	3.87	0.789

The results of the descriptive statistic evaluating and presenting the questionnaire variables of the respondents are displayed in table 3 (see above). The framework has 34 items, compounding 6 items of technology quality, 5 items of educator presence, 4 items of course organization, 7 items of interaction, 6 items of student's self-efficacy, and 6 items of student satisfaction. As presented, the result of mean and standard deviations reflect that the respondents have a tendency to perceive a high degree of emphasis on the positive side of the research items with the mean scores higher than 3.00 on a five-point Likert scale. In terms of standard deviation, all of the values appear low, meaning that data are clustered around the mean.

Table 4. Student satisfaction

Items	Mean	Std. Deviation	Median	Interquartile Range
SS1. Overall, I am satisfied with the blended learning during the COVID-19 pandemic.	3.92	0.77	4.00	0
SS2. Overall, I am satisfied with the technology quality.	3.85	0.79	4.00	1
SS3. Overall, I am satisfied with the educator presence.	4.00	0.72	4.00	0
SS4. Overall, I am satisfied with the course organization.	3.94	0.79	4.00	0
SS5. Overall, I am satisfied with the level of interaction.	3.64	0.82	4.00	1
SS6. Overall, I am satisfied with my self-efficacy.	3.87	0.79	4.00	1

With regards to student satisfaction, according to table 4, the mean scores higher than 3.00 on a five-point Likert scale and low standard deviation values demonstrate that students are generally satisfied with blended learning during the COVID-19 pandemic. The median scores also provide a similar result with the same score of 4.00 for all the measurements in the scale. In addition, the interquartile range values show the responses are clustered together around the median scores, stating that there is an overall agreement among the students in terms of satisfaction. This is in correlation with item SS1 with the mean score of 3.92, the median score of 4.00, and the interquartile range value of 0. In other specific satisfaction areas, students relatively perceive the highest satisfaction with the educator presence with the record of 4.00 in the mean score and 4.00 in the median score. On the other hand, students are least satisfied with the level of interaction of courses with a record of 3.64 in the mean score and 4.00 in the median score.

Cronbach's Alpha coefficient of reliability test

The Cronbach's Alpha coefficient of reliability test is applied for every scale in the research model. Many researchers agree that Cronbach's Alpha value ranging from 0.8 to 1 would perceive a very good measurement scale, and Cronbach's Alpha ranging from 0.7 to 0.8 would perceive an acceptable scale (Nunally, 1978; Leech et al., 2005; Trong & Ngoc, 2008).

In the Item-total Statistics table, the important value that needs to be considered is the Corrected Item–total Correlation. Leech et al. (2005) claim that items with high item-total correlations (e.g. 0.4 or above) would probably show a moderate correlation with most of the other items and be a good component in the measurement scale. On the other hand, items with lower (e.g. less than

0.3) or negative item-total correlation values would not fit into the scale. Therefore, it is recommended to reexamine the items for modification or delete the items.

Table 5. Reliability Statistics and Item-Total Statistics (the second run)

	Cronbach's Alpha	**Corrected Item-Total Correlation**	**Cronbach's Alpha if Item Deleted**
Technology quality (TQ)	.773		
TQ1		.447	.757
TQ2		.567	.727
TQ3		.620	.713
TQ4		.443	.757
TQ5		.550	.732
TQ6		.484	.749
Educator Presence (EP)	.841		
EP1		.648	.808
EP2		.578	.826
EP3		.666	.803
EP4		.686	.797
EP5		.650	.807
Course Organization (CO)	.824		
CO1		.666	.770
CO2		.594	.803
CO3		.697	.755
CO4		.638	.783
Interaction (TL)	.850		
IL1		.550	.837
IL2		.629	.826
IL3		.606	.829
IL4		.608	.831
IL5		.664	.822
IL6		.659	.822
IL7		.564	.835

Self-Efficacy (SE)	.745		
SE1		.555	.678
SE2		.543	.685
SE3		.628	.633
SE4		.435	.740
Student Satisfaction (SS)	.830		
SS1		.717	.779
SS2		.401	.843
SS3		.748	.775
SS4		.610	.801
SS5		.626	.798
SS6		.532	.817

The results of Cronbach's Alpha coefficient and Corrected Item-Total Correlation for each of the scales are demonstrated from table 5 to table 10. The Cronbach's Alpha of Technology quality (TQ) in table 5 is accepted because its value (equals 0.773) is in the range from 0.7 to 0.8. In addition, all of the items have accepted Item-Total Correlations because they are above 0.3.

Table 6. Reliability Statistics and Item-Total Statistics of Educator Presence

	Cronbach's Alpha	**Corrected Item-Total Correlation**	**Cronbach's Alpha if Item Deleted**
Educator Presence (EP)	.841		
EP1		.648	.808
EP2		.578	.826
EP3		.666	.803
EP4		.686	.797
EP5		.650	.807

According to table 6, the Cronbach's Alpha of Educator Presence is a good value (equals 0.841) since it is above 0.7 and under 0.9. Moreover, all of the items in the scale also have sufficient Item-Total Correlations with values higher than 0.3.

Table 7. Reliability Statistics and Item-Total Statistics of Course Organization

	Cronbach's Alpha	**Corrected Item-Total Correlation**	**Cronbach's Alpha if Item Deleted**
Course Organization (CO)	.824		

CO1	.666	.770
CO2	.594	.803
CO3	.697	.755
CO4	.638	.783

From table 7, it is clear that the Cronbach's Alpha of Course Organization is satisfied (equals 0.824) because it is in the range between 0.7 and 0.9. In terms of scale items, all of their Items-Total Correlation values are also acceptable because they are all higher than the threshold of 0.3.

Table 8. Reliability Statistics and Item-Total Statistics of Interaction

	Cronbach's Alpha	**Corrected Item-Total Correlation**	**Cronbach's Alpha if Item Deleted**
Interaction (TL)	.850		
IL1		.550	.837
IL2		.629	.826
IL3		.606	.829
IL4		.608	.831
IL5		.664	.822
IL6		.659	.822
IL7		.564	.835

As indicated in table 8, the Cronbach's Alpha of Interaction is convincing for the research (equals 0.850) as it lies in the accepted range from 0.7 to 0.9. In detail, all of the Item-Total Correlations of measurement items in the scale are accepted as they are all higher than 0.3.

Table 9. Reliability Statistics and Item-Total Statistics of Student's Self-Efficacy

	Cronbach's Alpha	**Corrected Item-Total Correlation**	**Cronbach's Alpha if Item Deleted**
Self-Efficacy (SE)	.616		
SE1		.444	.534
SE2		.426	.538
SE3		.486	.513
SE4		.397	.554
SE5		.236	.613
SE6		.144	.658

Table 9 demonstrates that the Cronbach's Alpha values of Student Self-Efficacy are not reliable (equals 0.616) since it is under 0.7. On the other hand, apart from items SE1, SE2, SE3, and SE4, the Item-Total Correlation values of items SE5 and SE6 are insufficient (equals 0.236 and 0.144) because they are under the 0.3 threshold. Therefore, they have to be deleted from the scale and the reliability of the Student's Self-Efficacy has to be rerun as well. In table 3 (see Appendix A), it is to be seen that the Cronbach's Alpha of Student's Self-Efficacy is satisfied (equals 0.745), and other Items-Total Correlation values are sufficient enough for further analysis.

Table 10. Reliability Statistics and Item-Total Statistics of Student Satisfaction

	Cronbach's Alpha	**Corrected Item-Total Correlation**	**Cronbach's Alpha if Item Deleted**
Student Satisfaction (SS)	.830		
SS1		.717	.779
SS2		.446	.843
SS3		.748	.775
SS4		.610	.801
SS5		.626	.798
SS6		.532	.817

Finally, in table 10, the Cronbach's Alpha of Student Satisfaction is a convincing value (equals 0.830) because it is higher than 0.7 and lower than 0.9. Besides, all of the other items in the scale also have acceptable Item-Total Correlation values since they are all higher than 0.3.

The result of Exploratory Factor Analysis (EFA)

The Kaiser-Meyer-Olkin (KMO) index, according to Trong and Ngoc (2008), is used to assess the adequacy of factor analysis. KMO values vary from 0.00 to 1.00 and can be calculated for both the overall correlation matrix and each measured variable. Kaiser (1974) states that the KMO values should be higher than 0.7 and not be less than 0.5. Furthermore, Kaiser (1974) also describes some threshold of KMO values, including marvelous (KMO≥0.9), meritorious (KMO≥0.8), middling (KMO≥0.7), mediocre (KMO≥0.6), miserable (KMO≥0.5), and unacceptable (KMO<0.5). According to Leech et al. (2005), the Barlett test should be significant which means a significance (Sig) value is less than 0.05. This demonstrates that the variables are strongly linked enough to offer a suitable foundation for component analysis.

Another important aspect in EFA is the Total Variance Explained table, which shows how the variance is divided among the possible factors (Leech et al., 2005). The eigenvalue is an indicator of explained variance. In general, a factor with an eigenvalue higher than or equal to 1.0 is seen to be helpful in research. Leech et al. (2005) further explain that if the eigenvalue is less than 1.0, it indicates that the factor explains less information than a single item would explain. Therefore,

the majority of researchers would not consider the information obtained from such a factor to be adequate to justify preserving it. To put it simply, the researchers are only interested in factors whose eigenvalues are greater than or equal to 1.0, and any factor other than those would be neglected. In addition, the Total Variance Explained should be larger than 50%. This is a percent condensation factor and what percentage of variables are observed based on a 100% assessment (Trong & Ngoc, 2008).

In the multivariate data analysis, factor loading is deemed as a requirement. As for Leech et al. (2005), factor loadings are the correlation coefficients between each item and the factor, ranging from -1.0 to +1.0. They also point out that a negative loading simply indicates that the question must be read in the other manner from how it is stated for that factor. Usually, factor loadings less than or equal to |.30| are considered low and should be suppressed. On the other hand, loadings of |.40| or greater are typically considered high. Similarly, Hair et al. (2010) mention that factor loadings vary from |.30| to |.40| are considered at the minimum level, loadings greater than or equal to |.50| are considered practically significant. However, they also stress that an acceptable range for factor loadings also can depend on the sample used for the study. In this research with a sample of 104 respondents, factor loadings of 0.55 and above are significant and acceptable. In other words, if an item has a factor loading less than 0.55, it would be omitted from the construct.

The results of EFA of observed variables, including independent and dependent ones, are demonstrated from table 11 to table 13. According to table 11, the value of KMO of independent observed variables is accepted in the research (equals 0.784) since it is greater than 0.7. Similarly, the Sig value is also satisfied (equals 0.000) because it is less than 0.05. As a result, the table shows that the applied analytical method is suitable and all of the items are in correlation with each other.

Table 11. KMO and Bartlett's Test of independent observed variables

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.784
Bartlett's Test of Sphericity	Approx. Chi-Square	1200.503
	df	325
	Sig.	.000

In this study, EFA with Principal Component Analysis and Varimax is applied to assess the underlying structure for 26 independent observed variables in the questionnaire. According to table 12, there are five accepted factors. Respectively, their eigenvalues are 7.730, 2.320, 2.066, 1.668, and 1.362 (greater than 1.00). The cumulative of the Total Variance Explained is 58.255 %, which means that five factors extracted from EFA reflect 59,002% of the variation of all observed variables included.

Table 12. Total Variance Explained of independent observed variables

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.730	29.731	29.731	7.730	29.731	29.731	3.819	14.687	14.687
2	2.320	8.923	38.654	2.320	8.923	38.654	3.273	12.588	27.275
3	2.066	7.947	46.601	2.066	7.947	46.601	2.967	11.413	38.688
4	1.668	6.414	53.015	1.668	6.414	53.015	2.697	10.374	49.062
5	1.362	5.240	58.255	1.362	5.240	58.255	2.390	9.193	58.255
6	.987	3.795	62.050						
7	.976	3.755	65.805						
8	.903	3.471	69.276						
9	.853	3.280	72.556						
10	.817	3.143	75.699						
11	.762	2.932	78.631						
12	.710	2.731	81.362						
13	.580	2.230	83.593						
14	.569	2.189	85.782						
15	.479	1.841	87.623						
16	.459	1.767	89.389						
17	.410	1.577	90.967						
18	.408	1.568	92.535						
19	.351	1.352	93.887						
20	.342	1.316	95.202						
21	.270	1.040	96.243						
22	.249	.958	97.201						
23	.240	.921	98.122						
24	.207	.797	98.919						
25	.147	.567	99.486						
26	.134	.514	100.000						

Extraction Method: Principal Component Analysis.

Table 13. Rotated Component Matrixa of independent observed variables

	Component				
	1	2	3	4	5
IL3	.783				
IL6	.737				
IL4	.712				
IL2	.710				
IL5	.692				
IL1	.565				
IL7	.561				
EP4		.747			
EP2		.718			
EP3		.714			
EP1		.710			
EP5		.707			
TQ2			.797		
TQ5			.640		
TQ6			.632		
TQ1			.617		
TQ3			.582		
TQ4					
CO3				.831	
CO1				.716	
CO2				.707	
CO4				.618	
SE3					.815
SE2					.758
SE1					.723
SE4					.599

According to table 13, most of the variables of the study satisfy the conditions of EFA analysis because their factor loadings are greater than 0.55. There is only one exception which is item TQ4. Its factor loading is less than 0.55 so it has to be deleted from the scale. The result of the Rotated Component Matrix has ensured the influence of five independent variables on student

satisfaction. However, some changes are made in the items of the construct since the item SE5, SE6, and TQ4 has been omitted from the scale.

Table 12. KMO and Bartlett's Test of dependent observed variables

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.853
Bartlett's Test of Sphericity	Approx. Chi-Square	231.511
	df	15
	Sig.	.000

As shown in table 14, the KMO value of dependent observed variables is accepted (equals 0.853) because it is greater than 0.7. The Sig. value is also satisfied (equals 0.000) because it is less than 0.05. Both of the results state that the observed variables are correlated with each other.

Table 15. Total Variance Explained of dependent observed variables

Initial Eigenvalues			Extraction Sums of Squared Loadings		
Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
3.365	56.080	56.080	3.365	56.080	56.080
.823	13.721	69.801			
.651	10.858	80.659			
.487	8.112	88.771			
.362	6.027	94.798			
.312	5.202	100.000			

Extraction Method: Principal Component Analysis.

On the other hand, Total Variance Explained in table 15 accounts for 56.080 %, reflecting that 56.080 % of the variation of all observed variables included. The eigenvalue is sufficient (equals 3.365) as it is greater than 1.00.

Table 16. Component Matrix[a] of dependent observed variables

	Component
	1
SS3	.856
SS1	.831
SS5	.762
SS4	.757

SS6	.670
SS2	.583

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

According to table 16, all factor loading values of items are greater than 0.55. Therefore, the convergence between variables is maintained and all of them will be kept in the study.

Base on the results of Cronbach's Alpha reliability test and EFA, there are various adjustments in the elements of the construct. The research has attained specified values, the measures have qualified the convergent validity, and the EFA model is deemed as suitable.

Regression analysis and hypothesis testing

The coefficients of a linear equation containing independent variables that best predict the value of the dependent variable are estimated using linear regression analysis. The following formula illustrates the relationships that are tested:

$$\mathbf{Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5}$$

Where:

Y: Student satisfaction - SS

α: intercept (the constant)

β_i (i=1-5): unstandardized slope coefficients of the independent variables (Technology Quality - TQ, Educator Presence - EP, Course Organization - CO, Interaction - IL, and Student's Self-Efficacy - SE)

$\mathbf{X_i}$ (i=1-5): scores of the independent variables (Technology Quality - TQ, Educator Presence - EP, Course Organization - CO, Interaction - IL, and Student's Self-Efficacy - SE)

Table 17. Model Summary[b]

Model	R	R Square	Adjusted Square	RStd. Error of the Estimate	Durbin-Watson
1	.713[a]	.508	**.483**	.41738	**2.107**

a. Predictors: (Constant), SE, EP, TQ, IL, CO

b. Dependent Variable: SS

According to table 17 the Correction Coefficient–Adjusted R Square equals 0.483, which means that there is about 49% of student satisfaction variance explained by five independent variables in the model. In other words, about 51% of student satisfaction variance is explained by other variables that are not included in the research model. The model, therefore, is moderate in predicting student satisfaction.

Durbin-Watson value is a test for autocorrelation in the residuals from regression analysis (Leech et al., 2005). The value of Durbin-Watson usually ranges from 0 to 4. According to Trong & Ngoc (2008), the closer to 2 the Durbin-Watson value is, the higher the chance there is no

autocorrelation in the residuals. As presented in table 17, the Durbin-Watson value is 2.107, meaning there is no record of autocorrelation.

Table18. ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	17.648	5	3.530	**20.261**	**.000[b]**
	Residual	17.072	98	.174		
	Total	34.720	103			

a. Dependent Variable: SS

b. Predictors: (Constant), SE, EP, TQ, IL, CO

The ANOVA table 18 shows that the F value is significant (equals 20.261), reflecting that the combination of the predictors unquestionably predicts student satisfaction. In addition, the p-value (Sig.) is less than 0.05, showing that the regression model is suitable with the data collected and all of the independent variables are in correlation with the dependent variables.

Table 19. Coefficients[a]

		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
Model		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	.300	.391		.766	.445		
	TQ	.260	.093	.238	**2.804**	**.006**	.694	**1.441**
	EP	.204	.076	.240	**2.678**	**.009**	.626	**1.598**
	CO	.192	.080	.216	**2.385**	**.019**	.614	**1.628**
	IL	.161	.076	.180	**2.126**	**.036**	.699	**1.430**
	SE	.103	.077	.101	**1.331**	**.186**	.868	**1.151**

a. Dependent Variable: SS

According to the Coefficients table 19, most of the independent variables has the p-value (Sig.) less than 0.05, and t statistic |t|>2 except SE. This means that most of the variables, including TQ, EP, CO, and IL have influences on student satisfaction with blended learning during the COVID-19 pandemic. In contrast, the variable SE has Sig.= 0.186 > 0.05 and t statistic t= 1.331< 2, proving that there is no effect of student's self-efficacy on student satisfaction during the COVID-19 pandemic.

Multicollinearity test is conducted to avoid inaccurate results about correlations among the independent variables. Commonly, the Variance Inflation Factor (VIF) value is examined to test

for the chance of multicollinearity. According to Hair et al. (2010), a VIF value less than 3 is not a problem. It can be seen from table 4.4.3 that the VIF values of TQ, EP, CO, IL, and SE respectively are 1.441, 1.598, 1.628, 1.430, and 1.151. All of them are less than 3, proving that there is no multicollinearity between variables in the regression model.

Test of normality of residuals and homoscedasticity is the examination of data to look for the variance of error terms appearing constant over the range of values of the independent variables (Hair et al., 2010). Hair et al. (2010) further states that "when the error terms have increasing or modulating variance, the data are said to be heteroscedastic". The normality of residuals and homoscedasticity are presented through the Histogram, the Normal P-P Plot, and the Scatterplot of Regression Standardized.

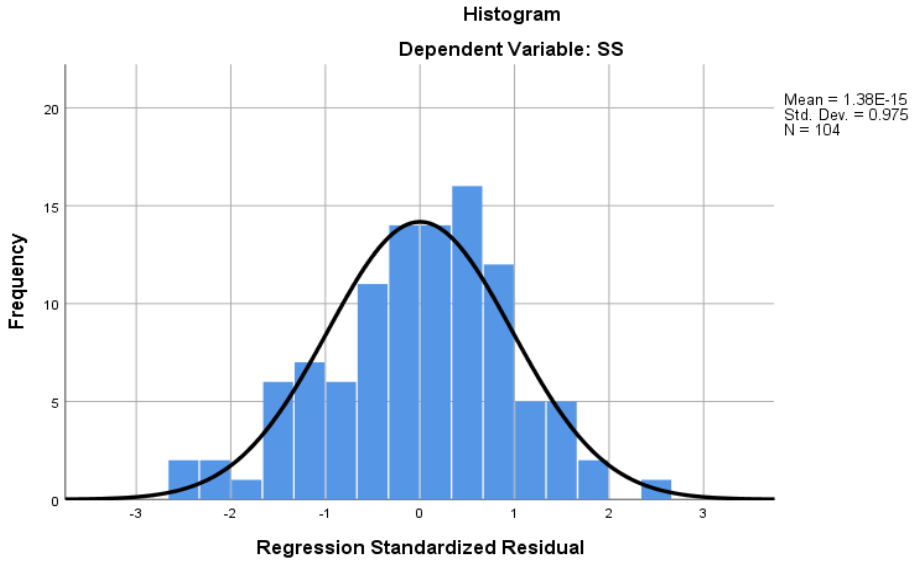

Chart 1. Histogram of Regression Standardized Residual

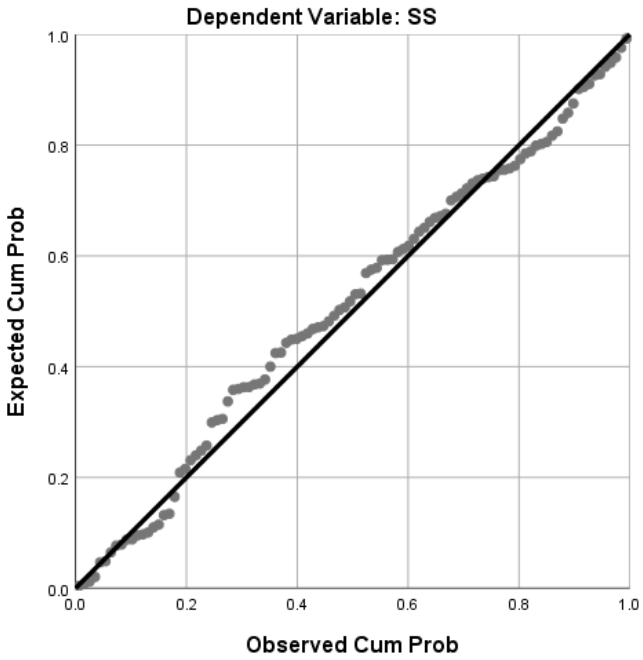

Chart 2. Normal P-P Plot of Regression Standardized Residual

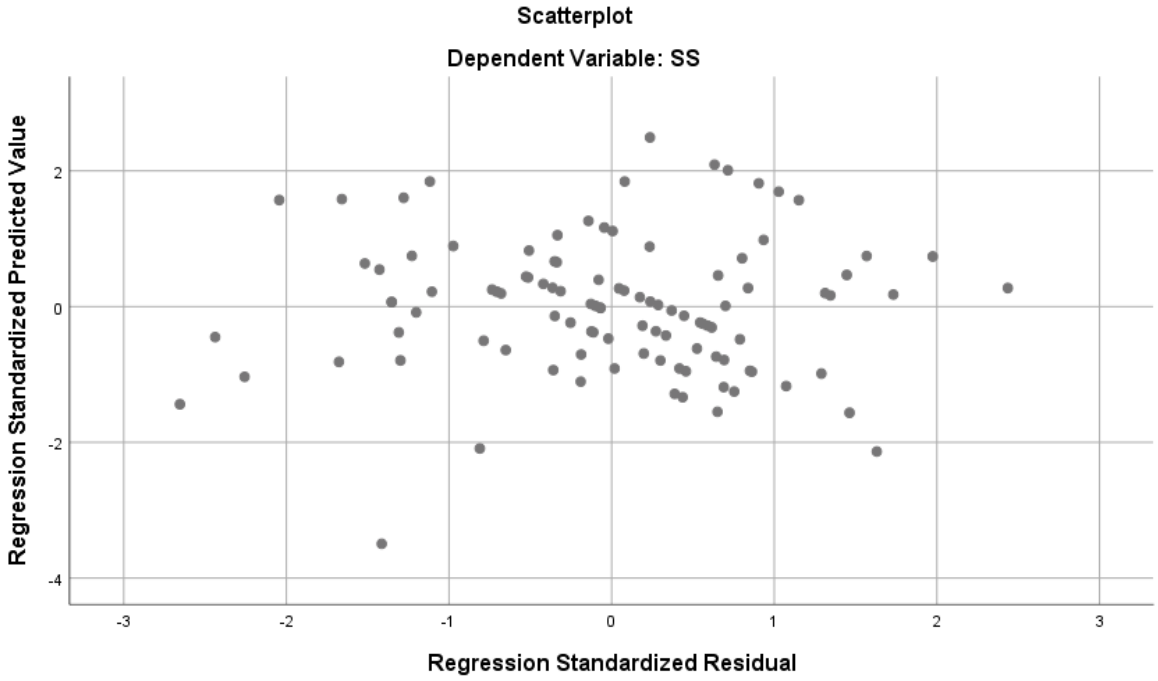

Chart 3. Scatterplot of Regression Standardized Residual

In Chart 1, the Mean equals 1.38E-15 (approximately 0), and the Standard Deviation equals 0.989 (approximately 1). In chart 2, the percentiles in the residual distribution are clustered along a diagonal. As a result, the assumption of the residuals' normal distribution is not violated.

The distributed normalized residuals in chart 3 are centered around the zero line, indicating that the linear relations are not violated as well.

The regression equation is presented and the hypotheses are confirmed as follows:

SS = 0.3 + 0.26*TQ + 0.204*EP + 0.192*CO + 0.161*IL

H1. Technology quality will positively influence student satisfaction in the blended learning context during the COVID-19 pandemic. According to the table 4.4.3, technology quality (TQ) (with $\beta = 0.238$, $t = 2.804 > 2$, Sig. $= 0.006 < 0.05$) is accepted by the data. It is the second most influential factor on student satisfaction with blended learning during the COVID-19 pandemic.

H2. Educator presence will positively influence student satisfaction in the blended learning context during the COVID-19 pandemic. According to table 4.4.3, technology quality (TQ) (with $\beta = 0.240$, $t = 2.678 > 2$, Sig. $= 0.009 < 0.05$) is accepted by the data. It is the most influential factor on student satisfaction with blended learning during the COVID-19 pandemic.

H3. Course organization will positively influence student satisfaction in the blended learning context during the COVID-19 pandemic. According to the table 4.4.3, technology quality (TQ) (with $\beta = 0.216$, $t = 2.385 > 2$, Sig. $= 0.019 < 0.05$) is accepted by the data. It is the third most influential factor on student satisfaction with blended learning during the COVID-19 pandemic.

H4. Interaction will positively influence student satisfaction in the blended learning context during the COVID-19 pandemic. According to the table 4.4.3, technology quality (TQ) (with $\beta = 0.180$, $t = 2.126 > 2$, Sig. $= 0.036 < 0.05$) is accepted by the data. It is the least influential factor on student satisfaction with blended learning during the COVID-19 pandemic.

H5. Student's self-efficacy will positively influence student satisfaction in the blended learning context during the COVID-19 pandemic. According to the table 4.4.3, technology quality (TQ) (with $\beta = 0.101$, $t = 1.331 < 2$, Sig. $= 0.186 > 0.05$) is unaccepted by the data. It does not have an influence on student satisfaction with blended learning during the COVID-19 pandemic.

Discussion

This study has two main objectives clarified by two research questions. The first objective is to discover the level of satisfaction by the students with regards to the utilized blended learning mode during COVID-19 pandemic remote teaching. The second objective is to examine the factors influencing student satisfaction with regards to the utilized blended learning mode during COVID-19 pandemic remote teaching. Based on the extant literature, five hypotheses and a conceptual model are built. In the analysis, the SPSS software is used to test for the reliability of the data, the validity of measurement scales, the significance of all items, and the appropriateness of the conceptual model.

Regarding the first objective, the results show that the students are generally satisfied with blended learning during the COVID-19 pandemic remote teaching. Specifically, item SS1, "Overall, I am satisfied with the blended learning during the COVID-19 pandemic", record a mean score of 3.92 and a median score of 4.00. Educator presence perceives the highest satisfaction by the students with the record of 4.00 in both the mean score and median score. In contrast, students

are least satisfied with the level of interaction of courses with a record of 3.64 in the mean score and 4.00 in the median score.

About the second objective, the results find out that four factors positively influence the student satisfaction with blended learning during the COVID-19 pandemic remote teaching. These four factors are technology quality, educator presence, course organization, and interaction. One factor (e.g. student's self-efficacy) is proven to be uncorrelated with student satisfaction with blended learning during the COVID-19 pandemic remote teaching. The study also reveals that nearly 48% (Correction Coefficient–Adjusted R Square equals 0.483, see table 4.4.1) of the student satisfaction's variance can be explained by four factors in the model. Educator presence has the most impact on student satisfaction (with $\beta = 0.240$, see table 4.4.3) and interaction has the least impact on student satisfaction (with $\beta = 0.180$, see table 4.4.3).

H1. Technology quality will positively influence student satisfaction in the blended learning context during the COVID-19 pandemic. H1 is supported. The finding of the study is consistent with those of Aparicio et al. (2017), Eom, (2012), and Urbach et al. (2010). In detail, the study of Eom (2012) indicates that there are only two variables in technology (e.g. system quality and information quality) that affect the perceived e-learner satisfaction. These variables of technology quality could be viewed as one of the most critical items when measuring student satisfaction with e-learning. One of the reasons is students today are easily annoyed by the delays occurring in online systems. Therefore, an improvement in responding time and reliability in information delivery will possibly enhance student satisfaction with e-learning infrastructure.

H2. Educator presence will positively influence student satisfaction in the blended learning context during the COVID-19 pandemic. H2 is supported. The result of the study corroborates the ideas of Gray & DiLoreto (2016), who suggested that instructor presence did influence student satisfaction. Other researchers have attempted to address this finding by a clarification into the relationship between instructor presence and student engagement. Garrison et al. (2000), and Jaggars & Xu (2006) said that theoretically, the more the teacher is present in class, the more involved a student gets, and the more satisfied he becomes.

H3. Course organization will positively influence student satisfaction in the blended learning context during the COVID-19 pandemic. H3 is supported. Similar to the past research of Gray & DiLoreto (2016), a strong relationship between course organization and overall student satisfaction. This finding also confirms the idea of Eom et al. (2006) and Nguyen & Nguyen (2010) about the predictive nature of course organization to student satisfaction.

H4. Interaction will positively influence student satisfaction in the blended learning context during the COVID-19 pandemic. H4 is supported. This finding is in agreement with the previous study of Kuo et al. (2014), in which they claimed that all three types of interaction are in correlation with student satisfaction in the online learning environment. However, Bray et al. (2008) stated a different opinion in their findings as they assumed that student interaction is a polarized issue in the distance learning context some students preferred to work alone, while others clearly desired greater contact with other students so order to clarify knowledge or decrease feelings of loneliness. This might be the explanation for our finding that interaction has

the least impact on student satisfaction with blended learning during the COVID-19 pandemic remote teaching.

H5. Student's self-efficacy will positively influence student satisfaction in the blended learning context during the COVID-19 pandemic. H5 is unsupported. Similar to the findings of Eom (2012), this study failed to support statistically significant positive relationships between student satisfaction and self-efficacy. In contrast, many published studies by Gunawardena et al. (2010), Prifti (2020), and Shen et al. (2013) have shown that self-efficacy is a strong predictor of student satisfaction. A possible explanation for this result may be the lack of adequate items in the scale. Because self-efficacy is a broad-defined dimension, four items in the measurement scale are insufficient to conduct the analysis.

Conclusion and implications

The study is conducted with two primary research questions, to which the result has provided satisfactory answers. Regarding the first question, the finding has informed that the students, majoring in Business English in UEH, are generally satisfied with blended learning mode during the COVID-19 pandemic remote teaching. In other words, this finding has firmly disclosed the excellence of the university in applying blended learning in a time of mandatory distance education. Secondly, the result of the study has also demonstrated the significant relationships of several factors to student satisfaction. Those factors are technology quality, educator presence, course organization, and interaction. These valuable insights would unquestionably help the university improve learner satisfaction and strengthen its e-learning in education. Some notable implications are:

- **Technology quality:** Technology quality is one of the most influential factors of student satisfaction with blended learning during the COVID-19 pandemic remote teaching. Through the research, the students are found to have positive perceptions of the quality of technology applied in the distance learning system. Therefore, the university needs to guarantee that the platforms integrated into the systems are reliable and consistent. The platforms also have to be easy to access anywhere with the minimal requirement in the Internet connection.

- **Educator presence:** Educator presence is the most influential factor of student satisfaction with blended learning during the COVID-19 pandemic remote teaching. This finding has clarified the important role of lecturers in mandatory distance education nowadays. Through the research, the students were also found to have good impressions of the lecturer in terms of feedback and attention. Therefore, it is advised that educators actively provide feedback and communication to the students during and after class with the help of digital tools and platforms.

- **Course organization:** Course organization is always one of the critical factors that strongly affect student satisfaction, regardless of the education method. The answers received during the survey reflect that students also perceive good perceptions of the course organization. In detail, courses are well designed with activities that can help stimulate student participation and performances. The objectives and requirements of the courses are also clearly stated. These findings indicate the significant efforts of the university and lecturers in providing suitable courses for students. Therefore, it is suggested that the university and lecturers continue to pay attention to course design.

One of the useful ways for the student to improve the quality of the courses is through student feedback. The process of collecting feedbacks could be conducted before and after the courses to compare the students' expectations and perceived feelings about the courses.

- Interaction: Interaction is the least influential factor of student satisfaction with blended learning during the COVID-19 pandemic remote teaching. Through the research, the data reflects that student interacts frequently with their friends and lecturers during the courses through many different electronic means. The majority of them find that they can learn actively in the courses. However, some of them are still passively in class, considering the fact that distance learning cannot provide face-to-face interactions. Even after the class, they might not feel the need to communicate with lecturers or friends. On the other hand, both asynchronous and synchronous strategies such as online class discussion, group projects, should also be adopted hand in hand with the changes in the assessment scheme.

Limitations and future research

It is undeniable that there exist several limitations in this study. Firstly, the model was only tested in a small group of students majoring in Business English in UEH. As a result, the research model should be tested in a broader sample of students from different majors in various universities. Secondly, the conceptual model included only five factors, some of which are broad dimensions (e.g. interaction, student's self-efficacy). Because of that, the generalized results maybe cannot fully reveal the influences of some factors on student satisfaction. Future researches can be more detailed in exploring the influences of smaller segments of those broad-defined factors. On the other hand, future research could also shift the locus of the study to other factors such as learning performance, and student score and their interplays with student satisfaction. Thirdly, due to the limitations in time, cost and resources, the questionnaire was developed purely base on the extant literature and the researcher's experiences. Preliminarily qualitative research was not conducted for the pilot study. Therefore, several students might not clearly understand the questionnaire to provide the exact answers. In other future researches, it is advisable that the researchers spend time on preliminarily qualitative research in a pilot study in a focus group. By doing so, the study would provide more trustable meaning.

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