



## Online Learning During Covid-19 Pandemic: a View of Undergraduate Student Perspective in Malaysia

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July 25, 2022

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**Abstract.** The advancement of technology changes the mode of operation world-wide education industry, where educational services can be delivered either in face-to-face or online teaching. The outbreak of COVID-19 forced higher education institutions to shift from face-to-face teaching to fully online learning even though online learning yet to be fully implemented in many institutions. This trend has prompted us to study this interesting topic and gather information about undergraduate students' satisfaction of online learning from home due to the limited study focus on Malaysia. The operational of the study is based on the user satisfactions theories. A total of 156 questionnaires were distributed via judgement sampling guidelines. PLS-SEM was used for the data analysis. The results confirmed that, online learning system is useful but not user friendly. Technical system quality is up to the satisfactory level from students' perception. Furthermore, attitude was confirmed significantly impacting undergraduate students' satisfaction of online learning. Discussion of the findings, implication, and direction for future research are also presented in the final section of the study.

**Keywords:** Online learning; Perceived Ease of Use; Perceived Usefulness; Perceived Technical System Quality; Students' satisfaction

## 1 Introduction

Online learning is a type of internet-based education [1]; an innovative method which provides a time- and space-free learning for the learners' convenience to study in time frame and location simultaneously [2]. Obviously, the online learning trend has brought many exciting features to the world of teaching, learning, and has created many unimaginable opportunities [3]. Some researchers claim online learning provide more opportunities for the students to interact with their lecturer compare with traditional classes [4][5]. In addition, online discussions in asynchronous educational experiences facilitate a comprehensive review of knowledge by enabling students to prepare their ideas while posting a message to virtual conventions [6]. Asynchronous learning is the preferred way to facilitate in-depth online student discussions and connection [7]. Besides, considerable body of evidence has also shown that e-learning can lead to substantial cost savings, often as much as 50% relative to conventional learning. The savings was attributed to reduce preparation time, decreasing institutional capacity and the prospect of extending programs with emerging educational technologies [8][9]. Although many studies have done on the impact of online learning, traditional face to face class remain as the domain in Malaysia education system. Traditional learning model still able to generate lucrative income to the institution. Hence, some of the institutions choose to put limited effort in online learning before January 2020.

Unfortunately, the trend of learning forced to be change due to the outbreak of novel COVID-19 when Malaysia government imposed the movement control order (MCO) on March 18, 2020 [10]. The MCO caused a nationwide shutdown and forced all education go online. To ensuring smooth delivery of teaching and learning throughout the MCO period, some guidelines detailing the responsibilities of teacher, parents, students, and administrators was provided by Ministry of Education [11]. However, both education service providers and users are not ready with online learning system. The advancement of online learning from home evolved as a catalyst for today's educational institutions [12]. Moreover, education service providers are unsure how the system being perceived by their customer. Limited studies have covered on how to use online learning platform effectively during COVID-19 pandemic. To fill the gap, conducting a study on students' satisfaction of online learning from home during Covid-19 pandemic will give the direction on how to improve their online learning system. Accordingly, the current study is carried out to examine the relationship of online learning system and the teaching quality.

As students' satisfaction is progressively seen as a key factor in determining of online learning services in market competition [13][14], this study checks existing dimensions and establish new dimensions to close existing gaps by utilizing Technology Acceptance Model (TAM) to analyze the behavioral trends of online learning users. TAM explains the importance of perceived ease of use (PEOU) and perceived usefulness (PU) in determining perceived satisfaction and user attitudes toward a technology [15][16]. The attitude will therefore influence the behavioural intention of using the system [17][18]. This study inserts a new variable, technical system quality (TSQ), to enhance the application of TAM in the context of online learning.

## 2 Literature Review

The shift from traditional face to face to online learning promotes closer examination of the quality of instruction and course technology [19]. Some researchers [9][20] define online learning as a more accessible form of distance learning, allowing students who are deemed unorthodox and unsatisfied to have access to education services. [13] defined online learning is a form of teaching in which the multiple incorporation of technology is pursued, and it is a substitute for distance learning. In short, online learning represents the application of technology in the field of education, it is increasingly being studied. The domains of learning and teaching in the higher education institutions in Malaysia are undergoing major changes due to the COVID-19 pandemic [21][22]. Many universities are starting to offer web-based courses that support classroom-based courses. Online learning is attractive to many students because it provides flexibility in engagement, ease of access and accessibility has been found to be perfectly suited to the current scenario. However, limited studies have covered how to effectively use the online learning platform to enhance student satisfaction on learning online from home.

## 2.1 Students' Satisfaction

Students are the primary customers of educational institutions [23]. Student satisfaction is defined as “the favorability of a student's subjective evaluation of the various educational outcomes and experiences”. Student satisfaction has a significant consistency in predicting learning experience [24]. In fact, their satisfaction is critical for universities seeking to promote prospective students. Many studies concluded that student satisfaction is critical in determining service consistency and efficiency [13][14][25]. Indeed, student satisfaction is very important because it is the only success measure of higher education service providers [26]. Due to the COVID-19 lockdown, there is a growing demand for online learning; student satisfaction is critical in this situation. Previous research found a link between PEOU, PU, attitude and user satisfaction with online learning [14][27][28]. Furthermore, there is a substantial body of literature indicating that TSQ is the primary factors influencing student satisfaction and IS utilization in the educational environment [29]. [30] discovered that the strongest relationship between TSQ and satisfaction is essential. Thus, PEOU, PU, and TSQ are theorized as the main predictors of student satisfaction toward online learning during the COVID-19 pandemic, and their relationships are discussed in the following sections.

## 2.2 Perceived Ease of Use (PEOU)

PEOU is characterized as the degree to which a person considers it would be effortless to use a particular system [17], which is an imminent driver of acceptance of new technology-based applications. PEOU is a variable that influences the behavioural intent of using the system [15][17], particularly the adoption of new technologies by users who are looking for the easier way to accomplish a task [18]. Easiness is an essential element for online learning system because easy to use can encourage students more to use and accept online learning. Several studies have attempted TAM to study online learning and found that PEOU has a major effect on individuals' intention of using online learning systems [14][31]. In addition, the PEOU has been used as a prerequisite for e-satisfaction in various studies [13][14][15]. Consequently, the greater the PEOU of the online learning, the more optimistic the attitude and intention towards its use is. Thus, the likelihood of it being used and satisfied is greater. Hence, it is expected similar relationship may occur in this case as hypothesized below:

H1: Perceived ease of use have a positive effect on undergraduate students' attitude toward online learning from home during the COVID-19 pandemic.

H2: Perceived ease of use have a positive effect on undergraduate students' satisfaction of online learning from home during COVID-19 pandemic.

## 2.3 Perceived Usefulness (PU)

Perceived Usefulness (PU) is the degree to which the user believes that using a system would improve their job performance and can help the user perform better in an organization [17]. PU is described as the way a person considers their work

performance is enhanced by using a specific method. Studies have shown that PU has an important effect on the acceptance of technology, which can explain user behavioural intention [17][27]. When coming to online learning, PU reflects to the degree of reliability, effectiveness as well as cost efficiency from the use of technology, which was significantly impacts the online users' satisfaction [27][31]. Students are more satisfaction and have favourable attitudes towards online learning system once they believe it will help them accomplish their educational goals. Many researchers have applied TAM to online learning research and found that PU have a major effect on individuals' attitude and intention of using online learning systems [17][28][32]. Consequently, the greater the PU of the online learning platform, the more the attitude and intention towards its use is optimistic. Thus, the likelihood of it being used and satisfied is greater. We, therefore, hypothesized:

H3: Perceived usefulness have a positive effect on undergraduate students' attitude toward online learning from home during the COVID-19 pandemic.

H4: Perceived usefulness have a positive effect on undergraduate students' satisfaction of online learning from home during COVID-19 pandemic.

#### 2.4 Technical System Quality (TSQ)

In the success model of information system (IS) proposed by [29], technical system quality (TSQ) refers to technological progress as well as the accuracy and efficiency of the information-producing communication system. System quality is linked to system reliability, user-friendliness, software quality, and programme code consistency and maintenance [33]. For instance, [34] claimed that many people are still avoid using internet because they want to avoid the slow response time, heavy Internet traffic, and the lack of network connectivity. In addition, if existing users experience security issues or curriculum interruptions when using the system, this can lead to a decrease in the perception of user-friendliness of the machine, in effect influence attitudes and behavioural intent to use the platform, as well as the satisfaction of the system user [28][30]. Therefore, in this case, the quality of the technical system is considered vital in influencing the beliefs of users of the website. TSQ is found may have a significant impact on undergraduate students' attitudes toward using online learning from home and their satisfaction during the COVID-19 pandemic. Nonetheless, none of the preceding studies were conducted in to investigate the impact of TSQ towards students' satisfaction with online learning. To close the gap, a study on students' satisfaction with online learning from home during the COVID-19 pandemic as hypotheses below:

H5: Technical System Quality have a positive effect on undergraduate students' attitude toward online learning from home during the COVID-19 pandemic.

H6: Technical System Quality have a positive effect on undergraduate students' satisfaction of online learning from home during COVID-19 pandemic.

#### 2.5 Attitude

Attitude is defined as an individual's positive or negative feelings about engaging in the desired behavior [17][35]. The two are inextricably linked, and a positive attitude

toward ICT is commonly regarded as a necessary condition for successful implementation [35]. Studies on the formation of attitudes show that beliefs and attitudes are linked, as are attitudes and behaviors. Several studies have found that the effectiveness and ease of use of online learning programs, perceived usefulness of online learning, and students' technical level and skills all have an impact on students' attitudes [36]. After all, positive student attitudes and online learning behaviors are critical for student satisfaction and adoption of online learning [27][31]. Based on the preceding discussion, attitude may directly influence undergraduate students' satisfaction with online learning as well as mediates the relationship between the independent variables (i.e., PEOU, PU & TSQ) and the dependent variable (i.e., student satisfaction). Hence, this study assumes that:

H7: Attitude have a positive effect on undergraduate students' satisfaction of online learning from home during COVID-19 pandemic.

H8: Attitude mediates the relationship between perceived ease of use and students' satisfaction of online learning from home during COVID-19 pandemic.

H9: Attitude mediates the relationship between perceived usefulness and students' satisfaction of online learning from home during COVID-19 pandemic.

H10: Attitude mediates the relationship between technical system quality and students' satisfaction of online learning from home during COVID-19 pandemic.

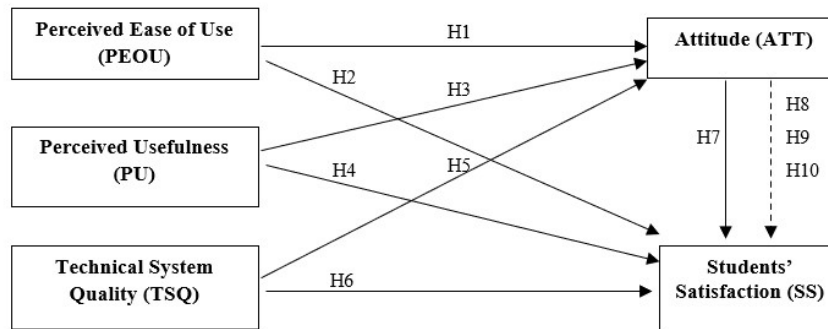


Fig. 2. Research Model

### 3 Research Method

A survey questionnaire via Google form was distributed to collect primary data from current undergraduate students. 156 responses were collected and utilized in data analysis. The questionnaire was divided into six sections. Section one presented the respondents' demographic questions. Section two has five questions related to PEOU, section three has five items to measure PU, section four consists of five items to measure TSQ, section five has five questions for ATT and section six has five items to measure SS. The five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree) was

used as the scale of measurement. Data collected were analyzed using PLS-SEM to assess the significance of the assumed relationship.

## 4 Results

Among 156 respondents, women accounted for 63.5% (n=99), among the 156 interviewees, while men accounted for 36.5% (n= 57). Majority of respondents were aged between 22 to 25 years (n=88), followed by 18 to 21 years (n=53) and 32 to 40 years (n=8). The remaining 7 persons was aged 26 to 30 years. Also, majority (n=109) have a bachelor's degree programs, and the remaining (n=47) have a Diploma. In terms of ethnicity, 68% (n=106) of the respondents were Malay, followed by Chinese (n=36) and Indians (n=14).

This study is using the SmartPLS v3.3.8 as the analysis tool to examine the measurement and structural model. According to [37], if the data was collected using a single source, the Common Method Bias should be tested. As shows in Table 2, no bias exists in the single source data since the single source in current study did not have a serious bias (i.e., VIF<3.3).

**Table 2.** Full Collinearity Testing

ATT	PEU	PU	TSQ	SS
2.300	2.103	1.883	1.786	2.588

*ATT=attitude; PEU=perceived ease of use; PU=perceived usefulness; TSQ=technical system quality; SS=students' satisfaction.*

In the measurement model assessment (see Table 3), the validity and reliability of the instruments were tested. All the loadings value ranged from 0.727 to 0.846 (> 0.708), the average variance extracted (AVE) values between 0.565 to 0.640 (>0.50) and composite reliability (CR) values between 0.866 to 0.899 (>0.70). All the threshold criterion for reliability and validity were met.

In addition, Heterotrait-Monotrait (HTMT) criterion was used to assess the discriminant validity. Table 4 shows that all HTMT Criterion values were below 0.85 [38]. Thus, discriminant validity was established in this study.

**Table 3.** Convergent validity

	Items	Loadings	AVE	CR
Attitude	5	0.738 – 0.788	0.565	0.866
Students Satisfaction	5	0.727 – 0.811	0.600	0.882
Perceived Ease of Use	5	0.737 – 0.771	0.570	0.868
Perceived Usefulness	5	0.765 – 0.846	0.640	0.899
Technical System Quality	5	0.726 – 0.819	0.606	0.885

*CR = Composite reliability; AVE = Average variance extracted*

**Table 4.** Discriminant Validity (HTMT)

	ATT	PEOU	PU	SS	TSQ
Attitude					
Perceived ease of use	0.676				
Perceived usefulness	0.683	0.719			
Students' satisfaction	0.838	0.622	0.602		
Technical System Quality	0.560	0.679	0.570	0.645	

ATT=Attitude; PEOU=Perceived ease of use; PU=Perceived usefulness; TSQ=Technical system quality; SS=Students' satisfaction.

Table 5 reported the findings on the path coefficients and justify the hypothesised relationships. PEOU ( $\beta=0.175$ ,  $p<0.05$ ) and PU ( $\beta=0.271$ ,  $p<0.05$ ) have a positive relationship with ATT but not associated with SS, thus H1 and H3 were supported but H2 and H4 were rejected. On the other hand, TSQ ( $\beta = 0.227$ ,  $p< 0.05$ ) was found positively related to SS but not on ATT, and ATT ( $\beta = 0.390$ ,  $p< 0.05$ ) has a positive relationship with SS. Hence, H6 and H7 was supported but H5 was rejected. Overall, the model explained 47.2% ( $R^2=0.472$ ) of the variance in ATT and 61.4% ( $R^2=0.614$ ) in SS. The model displayed acceptable predictive relevance since all  $Q^2$  values ( $Q^2 = 0.256$  for ATT and 0.346 for SS) were  $> 0$ .

**Table 5.** Result of Structural Model Assessment

Relationship	Std Beta	Std Error	t-value	p-value	Decision
H1: PEOU -> ATT	0.175	0.075	2.171	0.015*	Supported
H2: PEOU -> SS	0.044	0.078	0.605	0.273	Rejected
H3: PU -> ATT	0.271	0.079	3.457	0.000**	Supported
H4: PU -> SS	0.042	0.068	0.523	0.301	Rejected
H5: TSQ -> ATT	0.078	0.090	0.874	0.191	Rejected
H6: TSQ -> SS	0.227	0.074	3.080	0.001**	Supported
H7: ATT -> SS	0.390	0.072	5.466	0.000**	Supported

ATT=Attitude; PEOU=Perceived ease of use; PU=Perceived usefulness; TSQ=Technical system quality; SS=Students' satisfaction.

Notes: \*\*p-value  $< 0.001$ , \* p-value  $< 0.05$

For the mediation analysis, the bootstrap indirect effect reported in Table 6 shows that only the indirect effect of PEOU  $\rightarrow$  ATT  $\rightarrow$  SS ( $\beta = 0.069$ ,  $p< 0.01$ ) and PU  $\rightarrow$  ATT  $\rightarrow$  SS ( $\beta = 0.108$ ,  $p< 0.01$ ) were significant. Also, the confidence intervals bias corrected 95% does not straddle a zero in between, indicates the existence of mediation effect in these relationships. Hence, H8 and H9 were supported but H10 was rejected.

**Table 6.** Result of Mediation Analysis

Hypothesis	Std Beta	Std Error	t-value	P Value	5%	95%	Decision
H8: PEOU>ATT>SS	0.069	0.035	1.928	0.052	0.006	0.140	Supported



H9: PU>ATT>SS	0.108	0.041	2.628	0.009	0.038	0.193	Supported
H10: TSQ>ATT>SS	0.036	0.037	0.831	0.406	-0.027	0.122	Rejected

*ATT=Attitude; PEU=Perceived ease of use; PU=Perceived usefulness; TSQ=Technical system quality; SS=Students' satisfaction.*

*Notes: \*\*p-value < 0.001, \* p-value < 0.05*

## 5 Discussion and Conclusion

This study was undertaken to understand students' satisfaction of online learning during covid 19 pandemic. The findings indicated that only two (i.e., perceived ease of use and perceived usefulness) out of the three predictors are significantly related to attitude. Hence, implied that the undergrads prefer online learning systems that are easy to use, ease to navigate, and do not require much mental effort. The significant roles of perceived usefulness in online learning systems were analogies with the studies by [27][31][39]. Undergraduate students like online study systems if the learning systems are useful for their learning; the output of online learning is the same/or better than in the physical classroom. The student expected to learn and able to get support from the instructor effectively via online learning system. Surprisingly, technical system quality was found insignificant with attitude toward online learning system which contrast with the previous studies [40][41]. This is mainly due to the internet infrastructure in Malaysia where the students expected some lags and somehow disconnected from the online class. However, TSQ was found significantly related to students' satisfaction with online learning. Although students expected some technical issues such as disconnections and response time delay during their online learning process, they dislike these issues and unable to tolerant of them in the long term [30][42]. PEU and PU were shown irrelevant to students' satisfaction with online learning. This indicates that shifting to online class during the pandemic made students feel stress and uncomfortable [42] while facing with the internet connection problem was the main issue affecting students' satisfaction, regardless the ease of use and usefulness of the system.

Furthermore, attitude was found strengthened the link between perceived ease of use, perceived usefulness and students' satisfaction. The online learning system that is easy to use and navigate, while useful in assisting students' learning, doing coursework and preparing for ease, can generate positive attitude toward the online system and lead to higher level of satisfaction toward online learning systems. Thus, the university must create the online learning system that are easy to use and help the students learned effectively to increase the student satisfaction toward online learning systems. However, attitude was not mediating the relationship between technical system quality and students' satisfaction toward online learning systems. Students might see the technical issues such as bad internet connection are common during online, nevertheless if the technical problems persist for longer time, they will not satisfy. As a result, students' attitude toward online learning will not be change in this manner.

In this study, TSQ was integrated with the constructs from TAM to predict the students' satisfaction with online learning. The findings indicate that TSQ was successfully incorporated and extended with TAM since TSQ was proven as one of the predictors on students' satisfaction with online learning. Practically, the findings of this study

help the higher education institutions (HEIs) and the developers for online learning applications, to gain a better understanding of the factors influencing students' attitude satisfaction in online learning. The online systems need to be easy to use and navigate, and useful to affect the students' attitude. Also, the technical issues such as lagging, the display and the internet connect need to be improved to increase students' satisfaction. With the inclusion of attitude, PU and PEU were able to establish a high level of student satisfaction with the use of online learning from home during the COVID-19 pandemic.

As a conclusion, online learning has become a new normal in education [43,44]. Therefore, managing students' satisfaction particularly in online learning is vital for the institutions' performance [45]. To be effective, both educators and students must have a positive attitude toward the online learning platform. The student activities and behaviors (i.e., satisfaction) must be systematically monitor, especially when there are few or no opportunities for face-to-face encounters. Indeed, like any other business, the service provider must always ensure that the learning platform benefits both the educator and the student and to remain sustainable in the long-run [46,47,48,49,50].

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