Malaysian Journal of Social Sciences and Humanities (MJSSH) (e-ISSN : 2504-8562)
2022, Volume 7, Issue 4, e001412
DOI: https://doi.org/10.47405/mjssh.v7i4.1412

Online Learning and Online Assessments: Attitude Change and Students' Perceptions

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KEYWORDS:
Online learning
Accessibility
Perception
Attitude change
Technology acceptance model (TAM)

CITATION:
Loi, C. K., & Ang, M. C. H. (2022). Online Learning and Online Assessments: Attitude Change and Students' Perceptions. *Malaysian Journal of Social Sciences and Humanities (MJSSH), 7*(4), e001412. https://doi.org/10.47405/mjssh.v7i4.1412

ABSTRACT

The purpose of this paper is twofold. First, it is to examine 44 Malaysian undergraduate students' attitude change towards online learning and online assessments during the Covid-19 pandemic. Second, it intends to explore students' perception of the emergency online learning and online assessments. Technology Acceptance Model (TAM) by Davis (1989) is used as the framework to describe the factors that determine the acceptance of the use of computers and pertinent technologies in various technologies and user groups. The pretest and posttest questionnaire responses were based on participants' learning experience in the previous and current semesters, respectively. The findings show that in general, there was a positive change of attitude toward both online learning and online assessments. The interview data reflect how external factors namely institutional support, new and useful knowledge and online skills, accessibility, computer self-efficacy and enjoyment possibly play a role in the students' change of attitude. It can be deduced from the findings that e-learning usage during the pandemic was influenced by the attitude change which was in turn determined by the external factors.

Contribution/Originality: The findings have contributed to the existing literature in relation to attitude change and the factors that possibly determine the acceptance of online learning among undergraduate students during the COVID-19 pandemic. The findings also provide insights on students' perceptions of both online learning and online assessments.

1. Introduction

The COVID-19 pandemic brought many industries to a standstill as governments all over the world resorted to using lockdown measures to contain the spread of the pandemic. Similarly, the higher education sector was not spared from the onslaught of the crisis that resulted in universities closing their doors. For teaching and learning to continue,

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traditional face-to-face classes had to migrate to digitalized learning platforms. Lecturers and students alike had no choice but to embrace emergency online teaching and learning in the shortest possible time. Within the pandemic crisis context, the purpose of this study is twofold; first, it aims to determine if there is an attitude change among students in a Malaysian university toward online learning and online assessments. Second, it intends to explore students' perceptions on their online learning and online assessment experience at two points of time, that is, at the beginning and at the end of the same semester. Although there are some past studies undertaken to examine the factors that affect students' online learning, there is still insufficient information about online learning during the pandemic that might have affected students' perceived learning process. According to Aguilera-Hermida (2020), online learning is not the same as emergency online learning in that the former can be built over time to support learners. Whereas the latter needs "a creative and flexible emergent response to the particular crisis, and requires more reflection and communication than any of the previous educational experiences" (p. 7). In addition, it is found that the effectiveness of online learning greatly depends on the extent of users' acceptance (Tarhini, et al., 2016) which is in turn affected by their attitude towards the use of the technology (Davis, 1989). Based on the above reasons, there is a need to look into undergraduate students' attitude change and the factors related to the use and acceptance of technology s during the pandemic.

The Technology Acceptance Model (TAM) proposed by Davis (1989) was used as the theoretical framework for this study. In addition to examining students' attitude change using pretest and posttest surveys, the study also employed interview data to uncover the external factors that possibly contribute to the attitude change. The findings of the present study are discussed based Technology Acceptance Model (TAM) (Davis, 1989).

Past studies on e-learning have mainly employed the TAM model as a theoretical framework considering that it is an "empirically validated" theoretical model (Mamattah, 2016, cited in Loi, et al., 2022). Researchers have employed TAM to help explain and predict if the information technology is to be used by the user (Legris, et. al, 2003) and to trace how different external factors can influence 'perceived ease of use', 'perceived usefulness', 'attitude', 'intention to use' and 'actual use' of a technology (Loi, et al., 2022, p.235).

Davis (1989) proposed 'perceived usefulness', 'ease of use', 'attitude towards usage' and 'behavioural intention to use' as the four stages in the original TAM model. Davis (1989) noted that perceived usefulness (PU) is "the degree to which a person believes that using a particular system would enhance his or her performance" (Davis, 1989, cited in Mamattah, 2016, p,12) while 'perceived ease of use' is defined as the degree to which a user finds it easy to employ a particular technology (Davis et al., 1989). Perceived ease of use and perceived usefulness can influence users' attitude towards the use, the intention to use and the actual use of a technology (Davis, 1989). "Attitude towards usage" is defined as "the degree to which a person has a positive or negative feeling towards e-learning systems" (Escobar-Rodriguez & Monge-Lozano, 2012 cited in Salloum (2018, p. 54) while "behavioural intention to use" refers to "the motivation or willingness to exert effort to perform the target behavior" respectively (Nurhafizah, 2020, p.57).

Considering the respondents' online learning experience during the MCO (Movement Control Order) period that includes both live and self-paced learning, the present study defines online learning as learning using the online platform in the form of both

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synchronous (live interaction) and asynchronous (self-paced learning). Applying the TAM model, the study attempts to answer the following research questions:

i. Did students change their attitude toward online learning from the start of the semester to toward the end of the semester. If yes, how so?
ii. Did students change their attitude toward online assessments from the start of the semester to toward the end of the semester?
iii. What are students' perceptions on the emergency online learning and online assessments during the pandemic?
iv. What are the external factors as emerged in the interview data that possibly have led to the attitude change in using online learning?
v. Is TAM model applicable in terms of gauging students' attitude toward emergency online learning?

2. Literature Review

E-learning has been defined as any type of education with the use of the Internet and its technologies (Masrom, 2007, Ong & Lai, 2006). E-learning or online learning can be conducted in three different ways namely hybrid, web-assisted and fully online. Krishnan and Hussin (2017) view e-learning as using supporting tools such as the new technology devices and various electronic media in the teaching and learning process to enhance the understanding of knowledge through communication, active virtual interactions and training.

There are two forms of online learning, namely synchronous and asynchronous learning. Synchronous learning occurs in real time and is facilitated by electronic media (Kalpana, 2010; Mamattah, 2016) while asynchronous learning does not occur in real time and this gives more flexibility in the learning process (Kocur & Kosc, 2009). Databases, document libraries, e-books, forum messaging, web logs (blogs) are some of the tools employed in asynchronous learning (Obasa, 2010; Obasa et al., 2013).

In Davis's (1989) study on online learning or e-learning, he examined variables that contribute to user acceptance of information technology. His TAM model provides an explanation of "the determinants of computer acceptance that is general, capable of explaining user behaviour across a broad range of end-user computing technologies and user populations' (Davis, et al. 1989, p.985). The model includes 'attitude toward use' as one of the constructs and Davis (1989) explained that attitude towards usage can influence the behavioural intention to use the technology.

Past studies (e.g., Yue et al., 2013) show that students' prior attitudes consist of their prior attitudes toward ICT usage, the subject area, and online learning. In relation to this, the findings by Wang, et al. (2001) indicate that students' prior attitudes toward ICT usage can influence their attitudes toward online learning.

A study undertaken by Knowles and Kerman (2007) found that students' attitude toward online learning is more positive during the last week of the course than the first week. This was because online course provided a sufficient amount of student-to-instructor interaction, a high amount of student-to-material interaction, and a low amount of student -to -student interaction. In other words, when these factors contribute to students' motivation, they in turn help develop a more positive students' attitude towards online learning. In contrast, stress is a demotivating factor that can cause students to develop a

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more negative attitude towards their achievement in online exam (Knowles & Kerman, 2007).

On the same note, Martin (2020) states that interaction, motivation and stress (mental health) are three of the five important aspects (i.e., instruction, content, motivation, relationships, and mental health) that an educator must take heed when conducting online classes. In challenging situations such as the COVID-19 crisis, Dhawan (2020) suggested using interesting teaching and learning process and proper technique and learning support in online classes to enhance effective learning.

Such aspects are known as external factors in Davis's (1989) TAM model. According to Davis (1989), external factors can affect perceived ease of use, perceived usefulness, attitude, readiness and actual use of online learning. Abdullah and Ward's (2016) findings show that, self-efficacy, subjective norm, enjoyment, computer anxiety, and experience were the most common external factors that affect e-learning adoption and acceptance. However, in another study by Salloum (2018, p. 80), the following factors namely computer self-efficacy, enjoyment, subjective norm, social influence, quality of the system and information quality) were considered the most common ones and these factors are found to have an impact on students' perceived ease of use, perceived usefulness, attitudes, intention to use and actual use of the e-learning system.

3. Methodology

3.1. Participants and recruitment

The present study collected data using both quantitative and qualitative methods. Forty-four undergraduate students (31 were males and 13 were females) from a public university in Malaysia participated in the pretest, posttest and Interview 1 and Interview 2. All of them volunteered to participate in the study and were paid an honorarium for their participation. They were in the age group of 20-22 years old and were second-year undergraduates from the two faculties namely the business faculty and the information technology faculty. These students have earned at least an upper Band 3 for their MUET (Malaysian University English Test) results. Good proficiency in English was necessary given that English was used in the questionnaire and interviews to obtain their responses in relation to their online learning experience in general. These students have had some experience in using blended learning prior to the pandemic. During the pandemic, 100% of their course load was online.

3.2. Quantitative Data

The questionnaires were administered online at two points of time: in the first week of the semester (pretest) and the fourteenth week (last) week of the semester (posttest). The questionnaire administered in the first week asked questions on students' online learning and assessment experience for their previous semester (Sem 1 -2020/2021; October -February 2021) while the questionnaire administered in the last week of the semester asked questions on students' online and assessment experience throughout the current semester (Sem 2-2020/2021; March -July 2021) (see Table 1 and Table 2).

Questions in the pretest and posttest are a set of questions on attitudes adapted and compiled by the authors based on past literature (e.g., Knowles & Kerman, 2007; Mamattah, 2016; Mullen & Tallent-Runnels, 2006; Paechter, et al., 2010; Smart & Cappel,

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2006; Yue et al., 2013). These questions cover the following aspects: online stress, accessibility of online information, interaction with instructor and students, performance in online examination (Knowles & Kerkman, 2007, p. 76), fun in using the online platform, cost of e-learning (Mamattah, 2016), flexibility and convenience in online learning (Smart & Cappel, 2006) and motivation (Mullen & Tallent-Runnels, 2006; Paechter, et al., 2010); Yue et al., 2013). The questions included in the questionnaire are phrased in a way that reflect the advantages of online learning and online assessments. Thus, the questions are asked in a way that when students answer 'yes'/'agree', this shows a positive attitude change. This method of measuring attitude change is adopted from a study undertaken by Knowles and Kerman (2007). The quantitative data include the following:

i. Frequency and percentage for each item in pretest and posttest
ii. % difference of +value/-value
iii. The average participant agreement frequency in pretest and posttest data
iv. The average % difference of +value/-value

The above statistics are used to measure the attitude change. Attitude change is determined by comparing pretest and posttest results. When posttest result is higher than the pretest result, this shows a % difference of a positive value. The positive % difference is then considered as having a positive change (see Tables 1 and 2).

The questionnaire employed in the present study to measure the change in attitude toward online learning (pretest and posttest) consists of seven items. These items reflect students' prior experience of online learning (pretest) and their online learning at the end of the semester (posttest). The seven items are shown below.

i. I think my lecturers take a shorter time to upload slides.
ii. I am not desperately depending on friends' physical company and help.
iii. I find online lectures interactive and effective.
iv. I could focus better in online learning.
v. I can be disciplined in online learning although I learn alone.
vi. I enjoy the online lessons.
vii. I spend less money when engaging in online classes.

On the other hand, the questionnaire on online assessments consists of eight items as presented below:

i. I find that the online assessments such as open book tests, quizzes, exams with longer time frame help me to do better in my assessments.
ii. I find the instructions given in online assessments clear.
iii. (iii)I can do well in online assessments as I am allowed to refer to notes when answering the questions.
iv. (iv)I am motivated to answer test questions online.
v. (v)I can score high marks in online assessments as I can google/search for the answers online.
vi. (vi)I put less effort in studying but more effort in exploring information to answer online assessments.
vii. (vii)I can do better in online assessments as more time and flexibility are given prior to submission.

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viii. (viii)I feel less stressful when doing online evaluation/assessments compared to tests/examination conducted at the campus.

3.3. Qualitative data

A total of 44 students were interviewed individually in the 1st week of the current semester. Another round of interview was conducted with the same students in the last week. The present study opts for qualitative research method alongside the quantitative one as qualitative research method can help seek greater understanding of experiences (Gridley et al. 2009). The self-formulated questions given to student interviewees in Week 1 asked about their prior online learning and online assessment experience for their previous semester while the questions given to student interviewees in Week 14 asked them about their online learning and assessment experience throughout the current semester. The free-response questions given to student interviewees in Week 1 of the semester (Interview 1) and Week 14 of the current semester (Interview 2) are presented below:

Interview 1

i. During the previous semester, when you were required to learn from home and classes were solely conducted online (Online Teaching and Learning) due to the pandemic, did you miss your face-to-face classroom learning at campus? Why and why not?
ii. Are you inclined to think that you can do better for your traditional assessments like classroom assessments and final examination based on a master examination timetable in a physical venue compared to the online methods of assessments? Why do you say so?

Interview 2

i. Do you face more/fewer challenges in your online classes and online assessments towards the end of the current semester (Semester 2-2020/2021; March-July 2021) compared to the previous semester (Semester 1-2020/2021, October 2020 – February 2021)? Why? Please elaborate your answer.

ii. Do you think that you have more/less support from your institution/university for your online classes and/or online assessments towards the end of the current semester compared to the previous semester? If yes, in what way(s) your institution has given you the support?

iii. Can you specify the type(s) of support you would like your institution to provide you with in order to facilitate your online learning and/or online assessments?

iv. Do you find that you could handle your online learning classes and assessments better towards the end of the current semester compared to the previous semester or vice versa? Please elaborate your reason(s) with some examples.

The primary researcher carried out the two interviews via Google Meet. The researcher transcribed the recordings, coded the text data and analyzed the themes that emerged from the interview data (i.e., external factors that have influenced their online learning experience).

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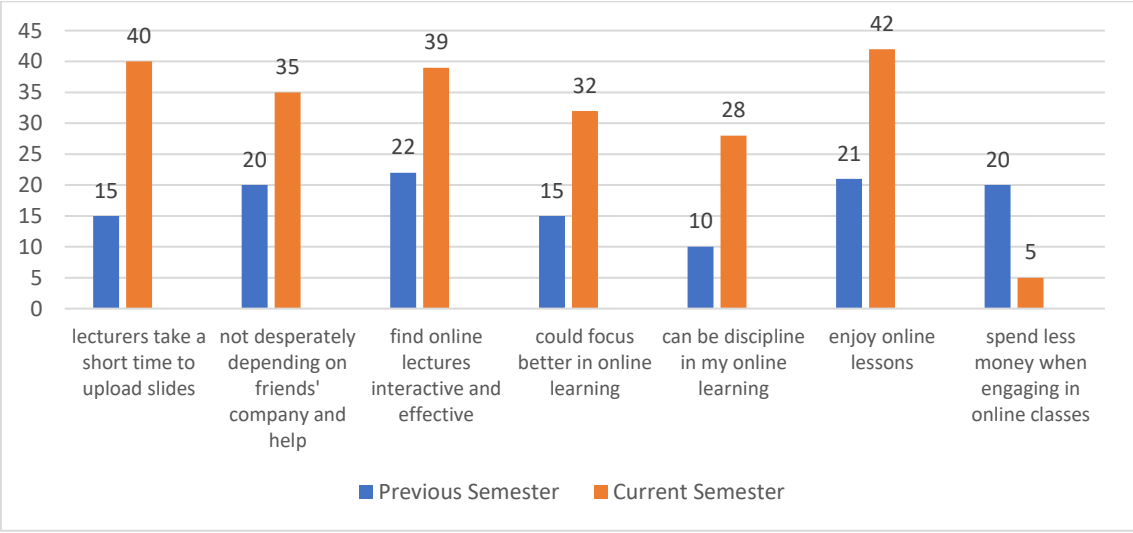
4. Result and Discussion

The first research question in the present study: Did students change their attitude toward online learning from the beginning of the semester to the end of the semester? There were seven items given in the questionnaire to obtain responses on online learning (see Table 1). When comparing the pretest-posttest data shown in Table 1 and Figure 1, the average pre-test % for all items was 39.9% and the average posttest for all items was 71.7%, yielding a % difference of +31.8. This % difference is positive, indicating a positive change of attitude from the start of the semester to the end of the semester. Tables 1 shows the tabulation of the results:

Table 1 – Pre-test and Post-test of student perception on online learning experience for Semester 1-2020/2021 and Semester 2-2020/2021

	Sem 1	**Sem 2**		
	Agree (Pre-test) N=44	Agree (Post-test) N-44	Frequency difference of (increase+/ decrease-)	Percentage difference of (increase + /decrease-)
(i)I think my lecturers take a shorter time to upload slides	15 /44(34%)	40/44 (90.9%)	+25	+56.8%
(ii)I am not desperately depending on friends' physical company and help	20 (45.5%)	35 (79.5%)	+15	+34%
(iii)I find online lectures interactive and effective	22 (50%)	39 (88.6%)	+17	+38.6%
(iv)I could focus better in online learning	15 (34%)	32 (72.7%)	+17	+38.6%
(v)I can be disciplined in my online learning although I learn alone	10 (22.7%)	28(63.6%)	+18	+40.9%
(vi)I enjoy the online lessons	21 (47.7%)	42 (95.5%)	+21	+47.7%
(vii)I spend less money when engaging in online classes	20 (45.5%)	5(11.4%)	-15	-34%
	Average pre-test %for all items (39.9%)	Average post-test % for all items (71.7%)		% difference of +31.8

Figure 1: Change in attitude toward online learning (Protest and Posttest)



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Students' attitude changed toward 'yes' (agree) as shown in Table 1. A % difference of participant agreement is positive for all items except one (item vii). A closer examination shows that the change in students' attitude toward online learning was more noticeable on some items than others. As shown in Table 1, the highest % difference is for item (i) 'I think my lecturers take a shorter time to upload slides' (56.8%) followed by item (vi) 'I enjoy online lessons' (47.7%), item (v) 'I can be discipline in my online learning although I learn alone' (40.9%), item (iii) 'I find online lectures interactive and effective' (38.6%) as well as item (iv) 'I could focus better in online learning' (38.6%) and item (ii) 'I am not desperately depending on friend's physical company and help' (34%). The last item (vii) 'I spend less money when engaging in online classes' shows a % difference of -34%, suggesting that this % difference is negative.

The data also revealed two statements that elicited the most change in attitude i.e., 'I think my lecturers take a shorter time to upload slides' and ' I enjoy online classes'. For item (vii) 'I spend less money when engaging on online classes', the students' attitude changed toward "no" (disagree) as the % difference is negative. The reasons why students would develop a more negative attitude toward the expenses incurred for online learning are probably that they needed to spend more for an increasing use of the Internet data for a better Internet coverage for their online classes and it is clear from their interview responses that they did not receive any sponsorship for their Internet subscription fee. Having to cover for the high expenses to engage in online classes for the two consecutive semesters has been a disadvantage and great concern for the students. The above phenomenon is reflected in the students' views as follows:

> (1) …if lessons (are conducted) fully online, I (will) face financial burdens as I am afraid that PTPTN is not enough to cover my expenses as I need to pay for additional and better Internet access. This is also not fair for students who stay in rural areas with poor access of the Internet…sometimes it is stressful for me when Internet is not stable.
>
> (2) My hometown does not have stable Internet connection. Therefore, I have to buy a lot of data in order to support my online classes.
>
> (3) For me, the only reason I miss face-to-face classes is because I do not have to pay more for the Internet as Wi-Fi is provided at the campus. My honest opinion is that some subjects/classes are easier to be conducted online but some are harder.

There is a change of attitude measured by the % difference of +38.6 percent in item (iii)' 'I find online lectures interactive and effective' and item (iv) 'I can focus better in online learning'. The interactivity and effectiveness can be due to the use of synchronous and asynchronous modes of online learning as reflected in Comment (4) and Comment (5), respectively. On the other hand, some students still find face-to-face classrooms more effective and interactive due to reasons such as the absence of the Internet problem and hands-on guidance needed for certain subjects as shown in the following comments:

> (4) I miss my face-to-face classroom because (when) I don't understand, I can ask directly to my lecturer and the lecture (is) was smooth-going without interruption like no Internet connection problem during online classes.

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(5) I did my face-to-face classroom learning in normal classes at campus because some of the subjects need to do tutorial with guidance from the lecturer or tutor if we face problems. Besides, learning with friends by your side is more enjoyable compared to sitting in a room by yourself.

As for item (iv) 'I can focus better in online learning', there are some contrasting comments as follows:

(6) …I find it harder to focus because I felt like I was not in the "zone". I was in my room and my brain just said " This is a resting place, not a working place" so it was hard to set my mind gear (focus in the lesson).

However, item (vi) 'I enjoy the online classes', shows that there is quite a big change of attitude as measured by the % difference of + 47.7%. The participants enjoyed online classes could be because they have benefited from the OTL (online teaching and learning) namely gaining new online experience, feeling comfortable and confident to ask questions using chats, watching videos to recall lessons if necessary and having a more efficient learning management system (Smart3UMS). Moreover, having lecturers with good computer self-efficacy that helped facilitate the teaching and learning process was another factor influencing the positive change of students' attitude toward online learning. These findings show that the above factors could have influenced students' positive attitudes toward online learning overtime. The findings support past literature (e.g., Bornstein & D'Agostino, 1992; Knowles & Kerman, 2007; Murphy, et al., 1995; Muthuprasad et al., 2021; Salloum, 2018) such that in general students' attitudes toward online learning would improve after learning in a supportive online environment. As shown specifically in Yue, et al., (2013) study, students' attitudes towards online learning was enhanced as a result of, among other factors, having mere exposure as reflected in their statement that "A well-replicated finding from social psychology is that people's attitudes tend to increase in the positive direction through mere exposure" (p.8).

Some of the students' responses are presented below:

(7) COVID-19 period has benefited me to a certain extent in relation to my learning and assessment experience because if it is not for the pandemic, I would not even have the experience of using online platforms such as Google Meet and Zoom and* (as well as) how to use them.

(8) I find that students are more confident and more comfortable to ask questions during online classes. Maybe because we just have to type a question without having all the attention directed at us like during face-to-face classes. Not only that, we also have a chance to recall the lessons through recorded videos of the lessons. Most of the lecturers will record the lessons and upload them on Smart2 UMS (University's learning management system). Therefore, we can watch the video if we miss any information during the online classes.

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(9) I think I have more support from the university for my online classes towards the end of the semester compared to the last semester- The Smartv3 platform is more stable in this semester, and the lecturers are also more familiar with the online learning tools when communicating with students.

This last comment above (Example 9) that states that "the lecturers are also more familiar with the online learning tools when communicating with students" is consistent with the high % difference of + 56.8 for item (i) 'I think my lecturers take a shorter time to upload slides'. This perhaps suggests that lecturers' computer self-efficacy has been enhanced as time progresses. Based on the findings above, we can conclude that generally there is noticeable positive change in students' attitude toward online learning (see Research Question i).

The second research question in this study: Did students change their attitude toward online assessments from the beginning of the semester to the end of the semester? There were eight items given in the questionnaire to obtain responses on online assessments (see Table 2). The results show an increase in the percentage of inclination to do better in online assessments from the beginning of the semester to the end of the semester. As shown in Table 2 below, this % difference is positive, thus showing a positive change of attitude from the start of the semester to the end of the semester. The tabulation of results is presented in Table 2 below:

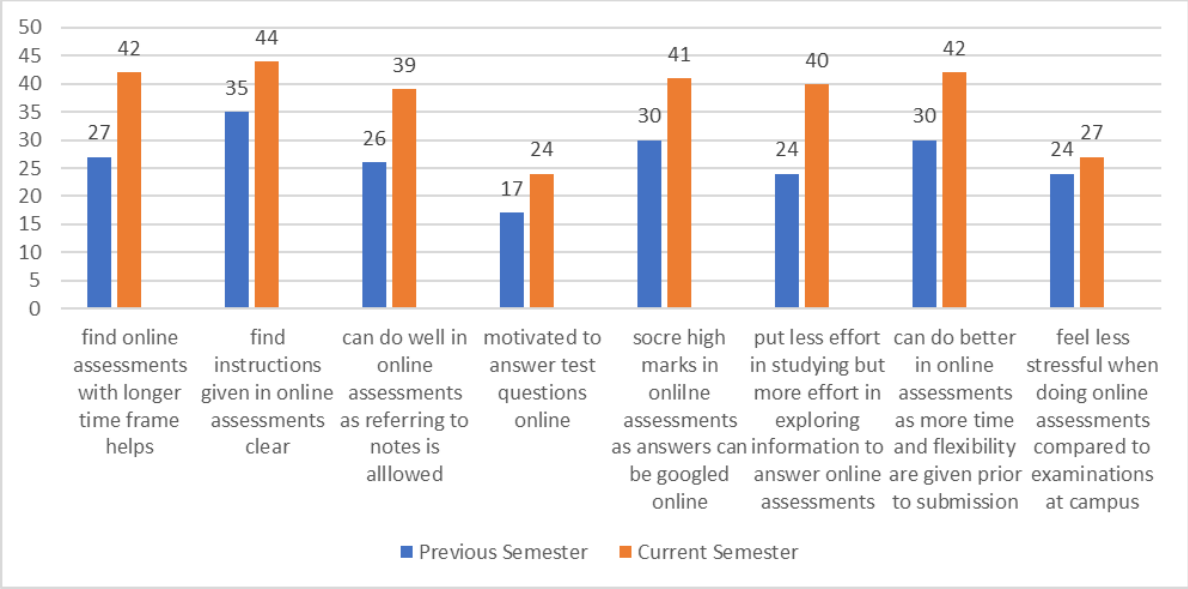
Table 2: Student perceptions on online assessments

	Agree (Pre-test) (N=44)	Agree (Post-test) (N=44)	Frequency % difference of (increase+/ decrease-)	% % difference of (increase + /decrease-)
(i) I find that the online assessments such as open book tests, quizzes, exams with longer time frame help me to do better in my assessments.	27 61.4%	42 95.5%	15	+34%
(ii) I find the instructions given in online assessments clear	35 79.5%	44 100%	9	+20.5%
(iii)I can do well in online assessments as I am allowed to refer to notes when answering the questions	26 59%	39 88.6%	13	+29.5%
(iv)I am motivated to answer test questions online.	17 38.6%	24 54.5%	7	+15.9%
(v)I can score high marks in online assessments as I can google/search for the answers online.	30 68.2%	41 93.2%	11	+25%
(vi)I put less effort in studying but more effort in exploring information to answer online assessments	24 54.5%	40 90.9%	16	+36%
(vii)I can do better in online assessments as more time and flexibility are given prior to submission	30 68.2%	42 95.5%	12	+27%
(viii)I feel less stressful when doing online evaluation/assessments compared to tests/examination conducted at the campus.	24 54.5%	27 61.4%	3	+6.8%
	Average pre-test %for all items (60.5%)	Average post test % for all items (84.9%)	10.8	% difference of +24

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The comparison of pre-test and post-test participant agreement frequency for the total number of 44 participants (see Table 2) indicates that the average pre-test participant agreement for all items was 60.5%, while the average posttest participant agreement for all items was 84.9 %, yielding a % difference of +24. This % difference is positive. In other words, students' attitude changed toward "yes' (agree). A closer examination shows that the change in students' attitude toward online assessments was more notable on some items than others. Item (vi) 'I put less effort in studying but more effort in exploring information for online assessments' has the highest % difference of + 36% followed by item (i) 'I find online assessments such as open book tests, quizzes, exams with longer time frame help me do better in my assessments' (+34%), item (iii) 'I can do well in online assessments as I am allowed to refer to notes when answering the questions' (+29.5%), item (vii) 'I can do better in online assessments as more time and flexibility are given prior to submission' (+27%), item (v) 'I can score high marks in online assessments as I can google/search for the answers online' (+25%), item (ii) 'I find instructions given in online assessments clear' (+20.5%), (iv) 'I am motivated to answer test questions online' (+15.9%) and item (viii) 'I feel less stressful when doing online evaluations/assessments compared to tests/examinations conducted at the campus' (+6.8%). As shown in Table 2, Item (vi) and item (i) have the highest % difference of +36 and +34, respectively; in other words, students' attitude changed toward "yes" (agree). This means that the two statements that elicited the most change in attitude were 'I put less effort in studying but more effort in exploring information for online assessments' and 'I find online assessments such as open book tests, quizzes, exams with longer time frame help me do better in my assessments'. On the other hand, the change in attitude for the statement 'I feel less stressful when doing online evaluation/assessments compared to tests/examination conducted at the campus' was less than 10 percent change. Figure 2 shows the comparison of students' responses in the pretest and posttest surveys, in relation to their attitude towards online assessments.

Figure 2: Change in attitude toward online assessments (Pretest and Posttest)



Some examples of students' views reflecting their preference for online assessments compared to the traditional method of assessment are presented below:

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(10) In my opinion, online learning has been made easier because the method used for assessments include open book method. It was easier to score on difficult subjects because I can always refer to notes.

(11) I think I do better in my online assessments. This is because we are given more time and freedom to complete our assignments and final examinations. It is less stressful to (for) me as I can complete the online assessments on (at) my own pace. Hence, I can manage to submit a better-quality work at the end of the day.

(12) Despite the obstacles that I have faced in online learning, I think it is a matter of adaptability of students whereby they required more time and training to adapt to the new norm of the online learning. I would say that I have done better for my online assessments compared to the traditional ones. This is because our current education system is such that we simply pile up knowledge and one needs to be good at memorizing which I am personally not very good at. So, online assessments like open book tests, quizzes, exams with longer time frame and the list goes on help students understand the theories better and think out of the box.

(13) I can do better in online assessments as I can refer to notes when I answer the questions.

(14) I personally think that I have done better for online assessments as I can refer to my reference books (e-books).

The lowest % difference of +6.8 is found for item (viii) 'I feel less stressful to do assessments online'. As shown in Example 7 above, one of the reasons being less stressful when engaging in online assessments is that a student can work on the assessments at his or her own pace. Students feel stressful doing assessments online and this can be due to the fact that Internet accessibility is still a problem for some students throughout the semester as expressed in the following opinions:

(15) The major challenge that I face during online learning is the stability of Internet connection…some of my friends who are living in rural areas also encounter such problems…

(16) The challenge of online classes is that I find it hard to focus during lectures and on some days, I don't have Internet connection at all. That makes it hard for me to complete some assignments that require extra reading materials.

(17) For online lecture, even after it ends, I feel as if the stress of being in a class does not leave me but rather weighs me down. It doesn't give me a sense of relief. Also since I live in an area where the Internet connection is not stable, sometimes the online classes will buffer or just cut off immediately.

As reflected in the above statements, no or lack of access to the Internet is the main factor that causes students to be stressful in their online learning and assessment experience.

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This seems to be one of the main reasons why item (viii) 'I feel less stressful when doing online evaluation/assessments compared to tests/examination conducted at the campus' yields the lowest % difference of +6.8 that is, students' attitude changed toward "yes" (agree).This phenomenon perhaps can be explained in the findings of Hanif et al. (2018) that show accessibility is one of the external variables that has a significant positive influence on perceived usefulness and perceived ease of use of the e-learning system. This also means that students who perceive online learning to be not useful and difficult to use will tend not to increase their use of online learning.

Besides addressing Internet accessibility and technical issues to facilitate online learning a participant holds that there is a more urgent need for higher education institutions to provide students with "psychological or emotional support". This view is shown in the following comment:

> (18) So far, our university has provided different kind of support to students during this online learning period to help ease their difficulties such as giving out data plan, free laptops, technical support, and ???else (so forth). But to have effective online learning, I think our university has to put more efforts (in) providing psychological or emotional support to students, especially during this pandemic that has brought along uncertainties and challenges that triggered students' stress and anxiety.

The findings of this study show that there is a positive change of attitude in e-learning towards the end of the semester compared to the beginning of the semester. This is evident in the pretest and posttest results for all the items i in the questionnaire except for item (vii) 'I spend less money when engaging in online classes'.

The items that greatly contribute to the change of attitude are item (i) 'I think my lecturers take a shorter time to upload slides' (56.8% increase of agreement) and item (vi) 'I enjoy the online classes' (47.7% increase of agreement). Students seem to have a positive change in their online classes due to the computer self-efficacy of their lecturers, the enjoyment of the online class and the benefits they can obtain from online learning. One example given in the interview data was that they learned to explore new and helpful online platforms (e.g. Google Meet and Zoom) that they had not used before prior to the pandemic. This shows that the new knowledge and the online skills they gained during the pandemic have perhaps caused them to perceive online learning as useful and this has thus motivated them to learn online. This deduction is in line with Aguilera-Hermida's (2020) study that shows that students employed more online platforms and educational tools during the pandemic and this' emergency e-learning programs' (Murphy, 2020, cited in Aguilera-Hermida,2020, p.6) has enhanced students' online skills that may help them with their future abilities on online educational tools.

The above finding of the present study also provides the support for studies conducted by Davis (1989) and Salloum (2018) which found that perceived usefulness was critical for students' attitude and behavioural intentions to use online learning. In other words, those who perceived online learning useful tended to have positive attitude change that subsequently led to an increase in their use of online learning. On the same note, Elkaseh, Wong and Fung (2015) held that a high degree of perceived usefulness would lead to a more positive attitude. Their study Elkaseh, Wong and Fung (2016) further supported this claim by establishing the correlation between perceived usefulness and the attitude towards the use of online learning.

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External factors affecting the use of online learning are diverse in the existing literature. In Salloum's (2018) study, eight common factors that affect online adoption and acceptance are, namely (i) computer self-efficacy, (ii) subjective/social norm, (iii) perceived enjoyment, (iv) system quality, (v) information quality, (vi) content quality, (vii) accessibility, and (viii) computer playfulness. However, in the present study, three out of these factors are found. They are computer self-efficacy, enjoyment and accessibility.

In contrast to the findings of the present study, Al-Gahtani and King's (1999) did not find enjoyment as a significant predictor of the use of online learning. The authors noted that, "the direct effect of enjoyment on attitude was not found to be significant, but an overall effect of enjoyment on attitude and hence in turn on usage arises from the direct effect of enjoyment on relative advantage" (p.289). Similarly, in a separate study by Igbaria et al. (1994), enjoyment was not considered a significant external factor but as a belief or a cognitive response besides 'perceived ease of use' and 'perceived usefulness' that can affect attitude toward using the system and 'end-user computing satisfaction (EUCS)' (Igbaria et al., 1994 cited in Al-Gahtani & King, 1999, p.278).

As noted above, the change of attitude is negative for item (vii) 'I spend less money when engaging on online learning'. There is a % difference of -34. This % difference is negative. This means that more students disagree that they actually spend less money for their full online classes (OTL) in this semester compared to the previous one. Some students even expressed their concern that this is an added financial burden to them as shown in students' interview responses.

As for student online assessments, the findings (see Table 2) show that there is a positive change of attitude for all items from the beginning of the semester to the end of the semester We can thus surmise that not only there is positive attitude change toward online learning, but there is also favourable attitude change toward online assessments among the students (see Research Question ii). The main items that contribute to the positive attitude change as shown in the % difference is item (vi) 'I put less effort in studying but more effort in exploring information for online assessments' (an increase of 36% of agreement in posttest compared to pretest) and item (i) 'I find that online assessments such as open book tests, quizzes, exams with longer time frame help me to do better in my online assessments' (an increase of 34% of agreement in posttest compared to pretest). Using open book to facilitate students' assessments was a common reason given by the participants (see the examples presented in the Results and Discussion section). This shows that higher educational institutions have provided some flexibility in the examination format when previously open book test was not allowed in the traditional assessment method. In addition, most tests have been changed to online assessments and such online assessments have allowed students to explore information at their own pace and convenience. In fact, there is some evidence from Gonzalez et al.'s (2020) study that suggest online learning during the pandemic has been beneficial in that students have improved significantly in their academic performance during the pandemic compared with a cohort from the previous year. This study's data have also provided useful insights into students' perceptions of online learning and online assessments during the lockdown period (see Research Question iii). In relation to Research Question iv, the findings of the present study show that students' positive attitude change toward online learning has resulted from several external factors namely institutional support,

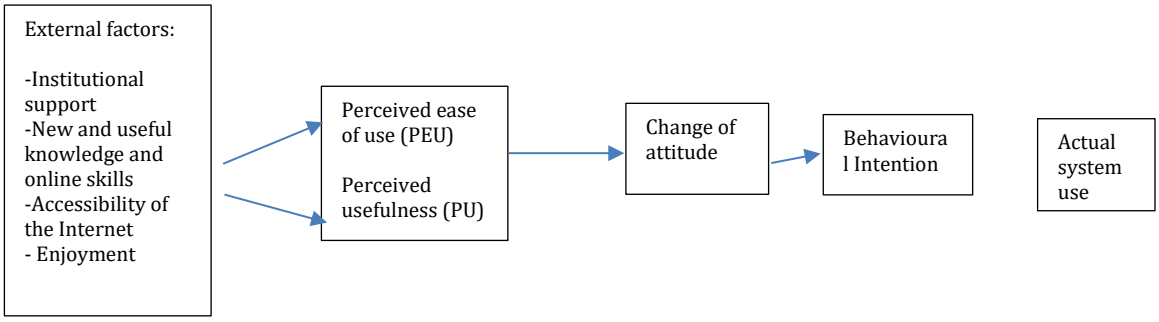
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computer self-efficacy, enjoyment, accessibility as well as new and useful knowledge and online skills.

As stated earlier, by the principle of TAM model, external factors are said to affect the perceived usefulness (PU) and perceived ease of use (PEU) and these two constructs (stages) further affect the attitude (be it negative or positive feelings) one forms towards e-learning (Al-Gahtani & King, 1999; Davis et al., 1989).

Based on the TAM model, the present study's data revealed the significance of several external factors (i.e., institutional support, accessibility, computer self-efficacy, enjoyment) as well as students' acquisition of new and useful knowledge and online skills. These factors have possibly influenced the perceived ease of use and perceived usefulness which subsequently led to the change of attitude in using online learning or the e-learning system. In this sense, the TAM model is applicable in terms of gauging students' attitude toward online learning during the pandemic lockdown (see Research Question v). In this study, the change of attitude is largely positive. One of these four external factors, 'accessibility', has been found to be an important determinant of students' perceived ease of use and perceived usefulness of e-learning in Salloum's (2018) study. While factors affecting the use of online learning are diverse and have been studied using models of use and acceptance of technology (e.g., Abdullah & Ward, 2016; Kemp et al., 2019; Salloum, 2018), this study has examined the external factors unique to the pandemic situation that influence students' attitude change which then leads to the use and acceptance of emergency online learning. The findings of the study illustrate the above phenomenon in the adapted TAM model presented in Figure 3:

Figure 3: The adapted TAM model of the present study



In terms of practical implications, institutional support plays an important role in enhancing students' online learning by providing some flexibility of learning and assessment options/formats to students. There is also the need to upgrade the existing management learning system and the campus' Internet connectivity as poor Internet connectivity has been cited by students as one of the main challenges in online learning. In fact, according to Sarsar et al. (2016), the success of e-learning adoption is greatly dependent on having a good Internet connection in addition to technological accessibility. Poor Internet accessibility has been a cause of stress among the students using online learning as expressed by the study's participants. Consistent with this phenomenon, it is shown that there is only a % difference of +6.8 for item (viii) 'I feel less stressful to do assessment online'. This finding is consistent with Aguilera-Hermida's (2020) that reported students expressing stress related to online learning and difficulties when completing schoolwork.

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In addition to providing technical aids and support, HEIs are urged to provide psychological or emotional support to students who experience stress and anxiety during the pandemic period. Such support can be in the form of providing positive feedback and reinforcement on students' performance by the teacher/instructor during the online classes. According to Oroujlou and Vahedi (2011), positive feedback can promote students' positive self-evaluation. A sense of accomplishment will also help students to have a better attitude in the learning process and outcomes. When there is a positive change, this will affect students' readiness for online learning. This is consistent with the TAM model in which attitude determines learners' readiness for online learning, with learners' readiness for online learning serving as a mediator of actual system use (Davis, 1989). Thus, teachers/instructors can play a vital role in providing such 'psychological or emotional support' particularly to students who face challenges and constraints in their emergency online learning during the COVID-19 pandemic.

5. Conclusion

The current study examined possible change in students' attitude and perceptions toward emergency online learning and online assessments between two points in time during the pandemic lockdown (i.e., the beginning and the end of the semester). The findings have indicated noticeable change in students' attitude apart from providing useful insights into students' perceptions of both online learning and assessments. The findings have also suggested that students' positive attitude change is consequence of several external factors namely institutional support, computer self-efficacy, enjoyment, accessibility as well as new and useful knowledge and online skills.

Therefore, institutional support can be given to students, for example, by equipping them with the tools and skills needed to enhance their computer self-efficacy. It is believed such support can contribute to both teachers' and students' confidence and success in an online environment (Nonis & Fenner, 2012). HEIs can also provide support in terms of allocating funds to develop or update the e-learning system or learning management system. In other words, HEIs should be financially ready to enhance the e-learning system (Krishnan & Hussin, 2017). In addition, HEIs can improve the accessibility of the Internet by updating the learning management system. Apart from enhancing students' computer self-efficacy, lecturers' computer self-efficacy needs to be upgraded as well given that it facilitates online learning particularly the synchronous learning mode.

The above external factors seem to be the factors that enhance students' perceived ease of use and perceived usefulness which will eventually lead to positive change of attitude. The present study suggests that intrinsic motivation should be given equal importance to enhance students' positive attitude and readiness for online learning. Asnoted by Vansteenkiste, et al. (2004), students with intrinsic motivation showed more persistence than students with extrinsic motivation, Similarly, Bye, Pushkar, and Conway (2007) found that interest and intrinsic motivation predicted positive effect. The findings of the present study add to the existing literature by offering (i) findings on student perceptions on online learning in general during the pandemic, (iii) possible external factors that affect students' positive change of attitudes and (iv) recommendations for improvement towards online learning. The study is, however, limited in that the findings are not meant for generalizations due to 2 reasons: (1) the participants were from a single university in Malaysia, and (2) the relatively small number of students who participated in the survey and interviews. We suggest conducting future studies to examine students' perceptions of the use and acceptance of emergency online learning using a bigger sample size

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comprising students from different HEIs (both public and private) across the province or country. Aguilera-Hermida (2020) stated that by comparing and contrasting challenges faced by HEIs in different countries, effective strategies can hence be developed to cope with these common challenges brought by the pandemic crisis.

Acknowledgement

We would like to thank the participants for their contribution to this research.

Funding

This work was supported by Universiti Malaysia Sabah (SDK0172-2020)

Conflict of Interests

The authors declare no conflict of interest in this study.

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