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Prevalence and Associated Factors of Student's Participation Smart Learning Environment

Nurul Aisyah Junaidi, Norisan Abd Karim, Haryani Haron
School of Computing Sciences, College of Computing, Informatics and Media, Universiti Teknologi Mara Shah Alam, Malaysia.
Corresponding Author's Email: norisan@fskm.uitm.edu.my

Abstract
The recent COVID-19 pandemic situation has caused abrupt transition to a smart learning environment, leaving many students to swiftly adjust to these changes. While academics believe that student engagement is essential for learning, the problem of participation in online learning appears to be unresolved due to many obstacles faced by students such as lack of IT infrastructures and lack of motivation due to non-physical interaction. The purpose of this study is to investigate factors of students' participation in the smart learning environment which can help to develop successful online courses by taking into account all of the aspects that influence students' intentions. Using surveys as the instrument, this study will be using Technology Acceptance Model (TAM) to evaluate student's intention to participate in Smart Learning Environment. The survey was distributed randomly and based on the results of responses from 383 students, Perceived Usefulness (PU) and Perceived Ease-of-Use (PE) were predictors of high intention to attend online class. In other sense, Compatibility (CO) and Perceived Knowledge (PK) results shows that it does not influences students' desire to take the online course, however it is critical that university must brace for any possible threats in the future for these two variables.
Keywords: Digital Learning, Smart Learning Environment, Class Participation, Smart Pedagogy, Technology-Embedded Learning.

Introduction

Smart learning environment has expanded exponentially throughout the world, especially in the year 2020 up until today. The new norm that people have to live within has bent the education industry towards the need for a digital transformation throughout the process of learning and teaching specifically being done in the online learning environment and some of it in hybrid classrooms. Seeing how the current pandemic situation limits social interaction, it has made the world utilize and appreciate the advancement technology that surrounds us which in turn has helped everyone to connect virtually via the internet. However, this sudden shift is still questionable in the prospects of technology foresights whether online learning can be sustainable for primary practicality especially in the long-term run (Ionescu et al, 2020). Due diligence is a critical matter to ensure an online learning environment can be adaptable and acceptable in today's society. Being that research suggests

that online learning is linked to multitude debate mainly on the grounds of technology support such as its adaptability, accessibility, the cost associated with online learning, new teaching method, sustainable learning process and also governance (Dhawan, 2020). In accordance with research study (Amir et al., 2020), it has demonstrated that, despite certain limitations occurring from the smart learning environment, students are able to respond positively to the sudden change to online learning approaches and assure that greater efficiency in online learning can be gained when being compared with the traditional learning environment. However, tension and anxiety can quickly demotivate and distract students' learning when dealing with uncertainty in a pandemic, as previous research has shown that fear and anxiety can impede the learning process (Chiu et al., 2021).

One of the United Nation Sustainable Development Agenda 2030 is about "Quality Education" where its Sustainable Development Goals 4 (SDG 4) aims to ensure "inclusiveness and equitable quality in education while promoting lifelong learning opportunities for all students' (Goal 4 Department of Economic and Social Affairs, 2022). Whereby online learning is considered a malleable learning route that allows integration of heterogeneous students and is able to enhance the notion of continuous learning that bears its quality. Online learning in another sense has become a significant tool in today's time where it creates opportunity for everyone to receive a quality education (Ghanem, 2020). However, there are several issues and challenges identified within the smart learning environment that hamper the benefits it carries such as (1) Lack of educators' technological skills, (2) Meeting the requirements of various students, and (3) The quality of online educational platforms. Here, educators play an important role in implementing a smart learning environment. Educators' willingness to explore and having sufficient expertise in technological skills are being mirrored by students itself. Positive attitudes given by educators in the prospects on how they manoeuvre their way using technology cater to the needs of effective and engaging online learning process (Mo et al., 2021). Technology readiness plays a crucial role among educators where they are able to grow in favour of digital transformation in the educational sector while ensuring full presence among students (Geng et al., 2019). Besides that, the ability to satisfy various students' demands via personalised directions is a dilemma that is encountered by both educators and the education institution (Fermin, 2019). The difference in characteristics in students are the reason for the heterogeneous grouping of students in higher learning institutes, where the variety of their technological skills could potentially cause digital gap and lack of motivation (Adams et al., 2018). Looking into the area of the quality of online platform used for online learning such as Google Meet, Zoom and Microsoft Teams, it also may influence the participation among students because the platforms perceived a set of usefulness and quality of education these students are receiving (Xiao & Long, 2019).

Smart learning environments in the context of Malaysia show a profound indication that Malaysia is slowly embracing the need for digital transformation in the educational sector. In 2020, most of the educational institutions in Malaysia adapt the requirement of the World Health Organization (WHO) to limit social interaction and embrace the new norm of social distancing. Although, the smart learning environment has been around since 2016 in Malaysia, where we can see the program eKelas initiated by Maxis, Malaysia telecommunication company with Multimedia Development Corporation (MDEC) which introduce digital learning to rural community by providing them with free internet access and quality educational content (Maxis eKelas, 2021), however the upbringing of this new way of learning was limited to small group of students in the rural area especially those who are in the primary school. Hence, to achieve quality online learning in Malaysia, it requires more

research and development especially in terms of the digital infrastructure available in Malaysia and how it can benefit every student. Study made by Project ID (Project ID, 2021) on student perspective of online learning during Covid-19 shows that around 55% of students indicated they are demotivated when going through the online classes. This is due to the fact that online classes are not well structured which gives too much flexibility to educators to pick classes on their suitability such as at night where it is not usually being done in the traditional learning environment. Besides, about 46% of respondents indicate that they are having a hard time participating actively in the online learning platform due to the unstable connectivity and underperformed devices they are using. Besides that, Song et.al (2019) stated that one of the most serious difficulties in online learning is low student involvement caused by improper design of interaction opportunities among students in the online learning environment. This finding supported by past research that indicate online learning environment could be just as successful as traditional learning environment only if the students are provided with an opportunity to interact in a sophisticated interaction activities within the online learning environment (Joksimović et.al., 2015). According to research study, problems that undergraduates viewed as being created by their instructors were among the most often mentioned impediments (22.85%) followed by problems with internet access (21.43%), the seemingly lack of social connections that a synchronous environment allows (18.71%) and challenges in comprehending the content presented (8.70%), or the limitations of online settings in regard to certain fields of study (8.28%) (Anastasakis et.al., 2021). Arguably these problems impact the positive experience of online learning environment which cause students to feel demotivated and not wanting to participate nor interact within the online learning environment. The research motivations is to find out the needs factors from both students and educators in the new learning environment in which technology are becoming increasingly prevalent in the education industry more frequent since Covid-19 pandemic incident. Hence, to ensure that Smart Learning Environment can be adapted in the long run, finding the root factors that cause participation among students is vital so that educators and stakeholders can implement better ways of making sure that online learning can be fully utilised in a way that capable to help those who face barriers such as geographical distances or physical limitations to learn through Smart Learning Environment.

Thus, in order to overcome these problems, this research objective is to identify factors that motivates or affects students to participate actively in the online learning environment.

Literature Review

Online Learning in the Context of Smart Learning Environment

There are many definitions of smart learning environment, Hwang et al (2008) defined smart learning environment as a learning condition that are mainly supported by technology that capable in adjusting and providing adequate support such as guidelines, responses, tips and techniques for both learners and educators at the appropriate places and time depending on their demands as students and educators. Both of their demands can be ascertained through analysing the behavioural patterns, students' achievements, and the contextual factors between online and offline in which they are situated in. Similarly, Singh and Thurman (2019), describes online learning as "educational opportunities" run through the various communication techniques and tools utilizing the different types of technologies that require connection to the internet. Such tools are computers, laptop, smartphone and other smart devices. Students able to gain educational information anywhere and at any given times

within the internet "spaces" through learning and connecting with their classmates and educators.

Historically, online learning was first introduced in 1981 where the introductory was made to provide learning activities with the support of digital tools in an attempt to mimic the current distant educational practices (Harasim, 2000). However, the implementation was not evident as the new model of education may carry an enormous amount negative effect that may affect the original content and objectives of learning and teaching (George, 2015). In the context of Malaysia, the availability and fast development of internet rendered the beginning of online learning as a learning and teaching tools to cater the traditional learning methods for long-distance or off-campus programmes (Goi and Ng, 2009). Open University Malaysia (OUM) is one of first Malaysia education institution that offer online learning course for working adults and other students to pursue their study in open-distance learning. Since then, many other universities in Malaysia not limited to private university start to promote their programmes in similar ways to best suits the current demands especially for working adults ("Evolution of Online Learning, 2021).

Current Issues of Participation in Online Learning

In response to the current wave of Covid-19 pandemic, educational industry without no other means have to move their teaching and learning activities to an online platform. The needs for digital transformation in learning activities however is not a new phenomenon as it has already been present in the educational industry since 1981 (Harasim, 2000; Adedoyin and Soykan, 2020). Nonetheless, one of the issues with online learning is student not participating in the online learning activities or went missing during the online class session. Barmore (2020) in her article mentioned that student's participation in online learning can be harmful to the society as a whole if not being assess in a good manner. Students who did not participate well in online learning may induces themselves to not acquiring the essential skills of communicating when they went out into the working world (Patricia Aguilera-Hermida, 2020). Further noted that the factors contributing to these negative behaviors are caused by both internal and external matters such as lack of drive, unconsciousness during learning session, digital illiteracy, and technical problems (Martin and Bolliger, 2018).

Besides that, the issue with online learning is the perceived ease of use in terms of quality of education it bears as students and educators are separated physically hence there is a minimal notion of physical interaction between them. Martin and Bolliger (2018) stated that the sense of social interaction and a feeling of togetherness lead to better instruction and learning results. Furthermore, educator behaviors and qualities, and also the strategies and materials employed for online lecture presentation have a significant effect on online learning. The institution's primary duty is to improve the processes used and to provide a trustworthy source of teaching methods. Designed to equip academic personnel with the necessary information, capabilities, and competencies aided in the delivery of quality education (Saleem et al., 2020). In principle, the goal of this online learning approach is to provide educational opportunities to a broader group in a much more accessible and affordable method (Pannen, 2021). Study done by Bird, Castleman and Lohner (2020) shows that there has been a significant reduction in program fulfillment among undergraduates in Virginia. Their findings add to the expanding body of research on online learning in higher education by demonstrating that student's having the difficulty with the transition to online learning, despite the additional freedom that came with it. In which the detrimental effect was especially noticeable among fairly low and far less experienced pupils. In regard to the

affordability, online learning requires great amount of internet data and updated technology tools for better receival and smooth online lectures. However, in the context of Malaysia, the high cost of bandwidth and limited connectivity has caused the acquisition of engaging material to students would be somewhat slow and glitchy which then made students to get frustrated and uninterested, affecting their ability to learn (Coman et. al., 2020).

Besides that, due to the sudden shifting of learning activities from traditional to online learning has shown an increase issue in the student participation and performance, this may be because of how they perceived usefulness of the overall online learning. This is because students are forced to learn despite the circumstances, they are in. Most institution made sudden decision without taking into account their mental and physical wellbeing and also the institution readiness. Previously, study mentioned that more students reported to have poor academic motivation and challenging interaction with lecturers and classmates when participating in online learning. Internal issues such as student preparation for remote learning, organizational skills, and trouble staying concentrated for lengthy periods of time has made online learning not viable as per reported (Cao et. al., 2020).

Emotional health is one of the issues that is co-related to the challenge of participation in online learning that can be classified as compatibility of online learning in regard to student emotional level. Prior to the COVID-19 pandemic, studies revealed the harmful psychological effects that confinement might have on individuals which isolation is frequently regarded as something of an unfavorable state of affairs for individuals who are subjected to it, and it might include feelings of anxiety and restlessness (Brooks et al., 2020). University students cited detrimental effects on students' psychological wellbeing and emotional health in research conducted during the COVID-19 lockdown. Students' pressure, anxiousness, and levels of depression increased during COVID-19 pandemic, according to study where they indicated that some unpleasant emotions, such as fear, concern, or restlessness, were heightened (Aristovnik et al., 2020). Stephan et.al., 2019 indicate that changes in feelings of resentment might be due to a variety of factors. For instance, the compatibility of the online course with technology tools, the lack of physical interaction with the professor, the high requirement for conscience knowledge, or difficulty communicating with the other classmates might all elicit rage.

Besides that, perceived knowledge among educators and student are also issues related to participation. Kebritchi et.al (2017) study found that there are there three key observations based on the perceived knowledge mainly difficulties with individual students, teachers, and content development. Goals, preparation, identification, and engagement in virtual classrooms were among the difficulties raised by students. Changes in academic duties, migrating from face-to-face to virtual, multitasking, and instructional techniques were all challenges for teachers. Material challenges included the involvement of teachers in content creation, media interaction in subject matter, the function of instructional methodologies in content creation, and content production constraints.

Research Framework on Student's Participation in Smart Learning Environment

Many of research pertaining to technology acceptance has employed the framework of Davis (1989) namely Technology Acceptance Model (TAM) to understand the usage of technological tools with intention to use. Sahin & Sahin, 2021 whom study is related to during the pandemic has employed the use of TAM to identify the relationship of the variables identified with intention to use online learning system. Between those that are often used and well recognised, the Technology Acceptance Model (TAM) stands out. TAM has been

chosen as the foundation for numerous research in the area of education because of its basic structure, which allows the concept to be evaluated to be expanded without becoming difficult. External elements such as trustworthiness, perceptions of the quality, emotions, and the aim of use are all supported by the Technology Acceptance Model (TAM). TAM is comprised of five major constructs: (1) perceived usefulness, (2) perceived ease of use, (3) Attitude (4) Actual use of technology and (5) Interests (Davis, 1989). In the extension of TAM, according to Venkatesh and Davis (2000), compatibility defined as the adaptability of the technologies to be utilised with the individual's task or employment, has a variety of implications on adoption especially on the emotional level of users. Emotional level is the state of students during the online learning environment. Whereby Kumaim et al., 2021 in his study has shown that emotionally demotivated students may hamper the positive experience of smart learning environment making them not compatible to undergo learning and teaching process using online learning platform due to various factors such as feeling alone, anxiety to uncertainty and anger during the online learning activities. Venkatesh et al (2003) proposed for a conceptual model that demonstrates how individuals accept technologies through its unified theory of acceptance and use of technology (UTAUT). The framework comprises four main variables: performance expectancy which stated that users believe their work performance skills have improved as a result of the advanced technologies used, effort expectancy which users consider how simple the technology is to use, social influence which users consider how some other individuals use the technology and facilitating conditions which users consider the technical infrastructure that facilitates how the technology is used. To adapt the UTAUT model to e-learning, Jaradat and Banikhaled (2013) uses it by introducing the website's overall quality as a component that they claimed was substantially linked with the desire to use. Besides that, Nassuora (2012) utilised the UTAUT to examine digital learning acceptability, focusing on emotions instead of intending behaviour whereas Ugur and Turan (2018) expanded the UTAUT by adding two additional predictors: the field of scientific knowledge and system engagement, to measure the adoption of online learning among academics.

Research Model

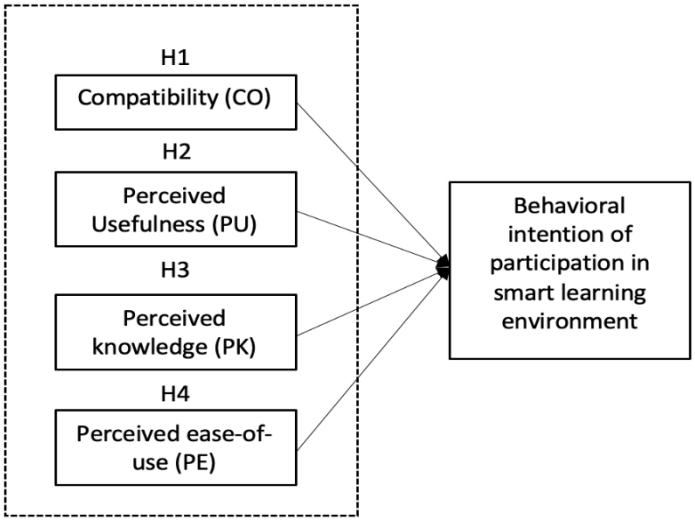

Figure 1. Proposed Conceptual Framework adapted from Technology Acceptance Model (TAM) developed by Davis (1989) and extension of Technology Acceptance Model (TAM) developed by Venkatesh & Davis (2000)

The following hypotheses are offered based on the proposed conceptual framework:

H1: There is a significant relationship between compatibility (CO) and the Behavioural intention of participation in smart learning environment.

H2: There is a significant relationship between perceived usefulness (PU) and the Behavioural intention of participation in smart learning environment.

H3: There is a significant relationship between perceived knowledge (PK) and the Behavioural intention of participation in smart learning environment.

H4: There is a significant relationship between perceived ease-of-use (PE) and the Behavioural intention of participation in smart learning environment.

Method

This study will employ quantitative method as the medium for this research study in order to meet the research objectives. Quantitative methos is used to profiling this research study target audience to determine their behaviours, behavioural attitudes, perceptions, and understanding relevant to the theme under evaluation, and whether significant factors estimate behaviours at a predetermined percentage. A questionnaire will be administered on two classes of students mainly the undergraduates and postgraduates from UiTM Shah Alam using a predetermined set of questions with primarily closed-ended questions, defined choices, and a rating scales to collect inputs. Utilizing reliability and validity measurements, this study will need to overcome the challenges in creating the relevant questions to the variables specified in the study.

Data Analysis

The Statistical Package for Social Science (SPSS) Version 26.0 was used to enter the data.
To address the research questions, regression analysis was used in this study.

Analysis and Discussion

Table 1

Number of Questionnaires received

Number of questionnaires received	**Percentage received (%)**	**Number of valid questionnaires**	**Percentage valid (%)**
383	100%	383	100%

Based on table 1 above, total of 383 respondents were received from random UiTM undergraduates and postgraduates' students. 76.8 percent of the respondents were mostly female followed by 23.2 percent of male. Majority of them are from the age group of 22-25 years old. Among them are mostly undergraduates' students.

Table 2

Descriptive Statistics

Variables	Mean	Mode
CO	3.118	3
PU	3.751	3
PK	2.598	2
PE	3.285	3
IU	3.396	3

The variables in this study were subjected to descriptive analysis. The results of the analysis are shown in Table 2 above, which includes the mean value and standard deviation for each variable. The mean values are between 2.5 and 3.8. The mode ranges from 2 to 3. Perceived Usefulness (PU) has the greatest mean value of 3.751 and Perceived Knowledge (PK) has the lowest mean value of 2.598.

Table 3
Reliability Analysis

No	VARIABLES	Cronbach's No. of Alpha	No of Item	Level of Reliability
1	Compatibility (CO)	0.806	16	Good reliability
2	Perceived Usefulness (PU)	0.925	10	Very good reliability
3	Perceived Knowledge (PK)	0.94	14	Very good reliability
4	Perceived Ease of Use (PE)	0.833	4	Good reliability
5	Intention to Use (IU)	0.776	4	Good Reliability

Table 3 shows the results of the reliability analysis on this research study. The results of Cronbach Alpha shows that all variables carry the value more than 0.70. Nunnally, 1978 indicate Cronbach Alpha will be considered as reliable if the value is more or less than 0.70. Based on 3, 3 out of 5 variables has good reliability and 2 out of 5 carry the value of more than 0.9 which considered to be very good reliability.

Table 4
Results of Regression Analysis with Intention to Use as the Dependent Variable

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.684a	0.468	0.389	0.562

Predictors: (Constant), CO, PU, PK, PE

Table 4 shows the model summary for multiple linear regression of the results of this study where the value of the R Square from the responses received is 0.468. From the results, it indicates that 46.8 % of the variation in the behavioural intention to participation in online learning environment can be further explained using the variables CO, PU, PK and PE. However, 53.2% of the variation in the behavioural intention to participation in online learning environment can be further explained by using other variables that are not mentioned in this research study.

Table 5
ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	98.609	46	2.144	5.897	<.001b
	Residual	111.966	308	0.364		
	Total	210.575	354			

a. Dependent Variable: IU
b. Predictors: (Constant), CO, PU, PK, PE

Table 5 shows the summary of the F-Statistics results gained for this research study. The F-Statistics is valued at 5.897. The P-Value from the regression model must be less than 0.05 for it to be considered significant. As for this study, the P-Value is valued at 0.001 which indicates that this research study regression model is reasonably suited to identify the relationship between dependent variables used in this research with the independent variable.

Table 6
Summary of hypothesis results

Hypothesis	Accepted/ Rejected	Reason
H1: There is a significant relationship between Compatibility (CO) and the Intention to Participate in online learning environment	Not Supported	P-Value (0.561) more than 0.05
H2: There is a significant relationship between Perceived Usefulness (PU) and the Intention to Participate in online learning environment	Supported	P-Value (0.025) less than 0.05
H3: There is a significant relationship between Perceived Knowledge (PK) and the Intention to Participate in online learning environment	Not Supported	P-Value (0.606) more than 0.05
H4: There is a significant relationship between Perceived Ease-of-Use (PE) and the Intention to Participate in online learning environment	Supported	P-Value (0.036) less than 0.05

Based on Table 6 above, the hypothesis for CO is not supported in this study as the relationship between the two variables in this study shows a negative relationship. Here, it considered the results to be inconsistent with each other whereby it may show that CO is happened to be not enough to be considered as variable to predict the outcome of student's intention to participation in smart learning environment. The compatibility in terms of emotional level of students may vary upon the period of Covid-19 pandemic which students might feel more overwhelmed during the initial phase of the pandemic rather than during post pandemic when this study is carried out. Furthermore, the hypothesis for PU is supported in this study and the relationship between the two variables in this study shows a positive relationship. Here, it considered the results to be consistent with each other and this indicates that perceived usefulness can be a good indication to predict students' intention to participation in smart learning environment. This is because usefulness is considered to be

valuable for students to utilise the usefulness of the smart learning platform for their continuous learning and teaching activities even when the environment does not allow any face-to-face interactions.

However, the hypothesis for PK is not supported in this study as the relationship between the two variables in this study shows a negative relationship. Here, it shows the results is not enough to be considered as variable to predict the outcome of student's intention to participation in smart learning environment. Even though, the majority of the respondents aged from 22-25 years old has agreed that they have no issues pertaining with the subject that they learned during the online and distance learning (ODL) semester owing to the fact that they are given the same opportunity and were address with same assignment in both online and traditional learning environment but it's not as good as traditional learning. Alavi et al (2002) defined perceived knowledge as "improvement in the student's judgments of knowledge and competence level prior to and after the learning experience." These findings match with the results of Wells and Dellinger (2011) which found that online learning did not produce a greater degree of perceived knowledge than traditional learning.

Last but not least, the hypothesis for PE is supported in this study and the relationship between the two variables in this study shows a positive relationship. Here, it considered the results to be consistent with each other and this indicates that perceived ease-of-use can be a good indication to predict students' intention to participation in smart learning environment. This is because ease-of-use is considered to be valuable for students to utilise the varieties of technology tools embedded in the smart learning platform for them to have a good experience in the learning and teaching process.

Discussion

According to the study, perceived usefulness (PU) and perceived ease of use (PE) have a significant and beneficial influence on intention to use. To encourage and promote students in terms of compatibility and perceived knowledge, institutions must encourage and help them. According to the findings of this study, perceived usefulness and perceived ease of use have a big, positive influence on student involvement in a smart learning environment because usefulness is considered to be valuable for students to utilise the usefulness of the smart learning platform for their continuous learning and teaching activities even when the environment does not allow any face-to-face interactions. While for, ease-of-use is considered to be valuable for students to utilise the varieties of technology tools embedded in the smart learning platform for them to have a good experience in the learning and teaching process without being disrupt by internet disconnection or high bandwidth usage. For students to participate in an online learning environment that is acceptable, gratifying, and successful, they must have appropriate background and skills. Furthermore, it has been established that students tend to act poorly while under stress, particularly when pushed to adjust to unfamiliar settings.

Based on the findings of this study, the influence of student participation in a smart learning environment is entirely mediated by Perceived Usefulness and Perceived Ease-of-Use. Thus, if learning institutions and other stakeholders want to boost student engagement for the demands of more sophisticated smart learning environments, it is critical to consider the results of this study on students' motivation to participate in this study.

Conclusion

Understanding the aspects that influence how students view the usefulness of online learning may be extremely beneficial for teachers and online learning management when attempting to develop a more useful and helpful online course for students. Based on a questionnaire-based survey, for the four hypotheses being tested, only two of it is being accepted in this study for students of undergraduates and postgraduates from UiTM Shah Alam which is Perceived Usefulness (PU) and Perceived Ease-of-Use (PE). Two other hypothesis is being rejected in this study for students of undergraduates and postgraduates from UiTM Shah Alam which is Compatibility (CO) and Perceived Knowledge (PK).

The study has some limitations that may be subject to future research in which study was conducted in only single tight knit community, comprising of respondents from undergraduates and postgraduates' students in UiTM Shah Alam, with more than 90% of the respondents are from the undergraduate's level of study. This is owing to the time limitation of only two to three months to complete the study. Hence, a larger study sample that includes other UiTM campuses or other schools or institutions will give greater insights and valuable data to enhance the research. It is also proposed that future research reconsider the independent variables to be utilised and the questions to be answered in order to properly depict it. It is also proposed to compare the intention to engage in an online learning environment to the intention to participate in a hybrid learning environment.

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