Malaysian Polytechnic Architecture Students' Readiness towards Online Learning

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ABSTRACT

Since the global pandemic of COVID-19 has impacted the schooling of approximately a billion students worldwide, as almost 120 countries have banned face-to-face learning method. Malaysian Polytechnic is one of the institutions that affected. The traditional face-to-face method change to the online learning. Even though our education system is implementing e-learning, Malaysia is lagging behind Western countries and Singapore in terms of e-learning growth. This paper aim to explore the acceptance level among Politeknik Sultan Abdul Halim Mu'adzam Shah (POLIMAS) architecture students on their readiness towards online learning. Technology Acceptance Model (TAM) is widely used among researchers locally and globally to understand technology acceptance. Based on (TAM), an online self-completion survey was conducted and completed by (sample size) respondents. This study used e-learning factor and readiness factor as external variable to the TAM. The outcome suggests that their perceived ease of use (PEU) and perceived usefulness (PU) of online learning acceptance is highly affected by student readiness and e-learning factor. On the other hand, in online learning use, both of these constructs positively impacted their behavioral intention. The results would later be applied as a model to assess the readiness of students for polytechnic online learning to enhance teaching and learning. The outcome of this analysis has both practical and theoretical consequences that were discussed at the end. This study will benefit institution in preparing and improving online learning for the student in the future.

INTRODUCTION

At the end of 2019, the world witnessed the first outbreak of an entirely new coronavirus in the twenty-first century, which killed and harmed millions of people worldwide. Since the global pandemic of COVID-19, significant impacts have been felt around the world in terms of the environment, education, and even our social lives. COVID-19 has impacted the schooling of approximately a billion students worldwide, as almost 120 countries have banned face-to-face learning method. Universities around the world have either cancelled all campus events, such as conferences, seminars, sports, and other activities, or have quickly transitioned many courses and programmes from a physical to an online delivery mode [1].

However, the spread of the COVID-19 pandemic has opened up new pages and challenges for education in Malaysia. According to [2] COVID-19 pandemic has led to the accelerating and expanding the introduction of Teaching and Learning (PdP) online at public universities (UA) and private higher learning institutions (IPTS). Educators need to go through the new habits 'the new normal' in the Teaching and Learning (PdP) process to ensure that students do not drop out of learning during the Movement Control Order (PKP) period. This abrupt shift in the educational system from two-way communication between educators and students in traditional learning to an entirely e-learning system may result in unintended consequences.

Even though our education system is implementing e-learning, Malaysia is lagging behind Western countries and Singapore in terms of e-learning growth. Teachers and students' readiness for e-learning acceptance are still moderate level [3]. This is mainly due to lack of internet access, weak or unstable and the inability of parents to provide gadgets such as personal computers and tablets. Students have faced major difficulties such as internet connectivity and difficulty in understanding the subject content as a result of online learning [4]. Despite the fact that Malaysia has an Internet penetration rate of over 80%, there is a major infrastructure gap between West and East Malaysia [2]. For example, residents of the capital city (West Malaysia) have access to high-speed Internet at speeds of up to 800 megabytes per second, compared in Sabah and Sarawak (East Malaysia) which have slower speeds and some areas without Internet access [2].

In contrast to classroom learning, students do not have the ability to communicate with lecturers and friends. There are lots of other factors affecting the student readiness to accept online learning such as technical factor, organization factor and social factor [5]. Therefore, the main aim of this paper is to suggest a conceptual approach to e-learning evaluation based on the Technology Acceptance Model (TAM) and to define the most common external factors. In addition, the understanding of these variables is expected to assist decision-makers in recognizing the strengths and shortcomings of our e-learning infrastructure and help students to reach higher levels of acceptance of e learning. TAM is one of the most widely used tools for analyzing the implementation of new technology, since it is a concise and influential theory in the information systems community. TAM's key flaw, according to many analysts, is its inability to describe external variables that are heavily dependent on technology, users, and application area. This research is meant to expand TAM in enhancing the method by including the readiness factor and e-learning factor that affects the PU and PEU of the student and their BIM adoption status.

LITERATURE REVIEW

Definition of E-Learning

Basically, e-learning is any teaching and learning that uses electronic networks to deliver content, interaction or facilitation. It is a learning system that is focused on formalized instruction but uses electronic tools focusing on the use of computers and the Internet. E-learning refers to the use of information and communication technology (ICT) to promote access to online learning and teaching tools [6]. E learning integrates information technology in the teaching and learning system to increase students' interest in learning methodology. Since the Covid-19 pandemic outbreak, e-learning has become vital in higher education institutions and is being implemented worldwide in educational establishments. Hence, readiness for e-learning allows students to create a comprehensive learning strategy in using e-learning tools to improve their knowledge while ensuring the successful implementation of IT skills among them. Even though operational definitions and assessment criteria for readiness are varied, most factors of E-learning readiness measure the following dimensions: the learner, the management, the personnel, the culture, the provision of relevant content, as well as technical, financial, and environmental resources [7]. Programs to promote e-learning, such as e-learning vision in institutions, infrastructure planning and education policy related to e-learning, facilities to provide technical support to educators and students, and education growth opportunities, all have a direct effect on learning outcomes. This combination will enhance the students' experience of e-learning and enable the institution to realize the vision of the importance of e-learning [8].

E-learning in Higher Education

The Malaysia Education Blueprint, which is a comprehensive plan of action that maps out the education environment for the period 2013-2025, was launched in Malaysia. The Malaysia Education Development Plan 2015-2025 (PPPM (PT) 2015-2025) has 10 surges including Global

Online Learning [9], Dasar e-Pembelajaran Negara (DePAN 2.0) [9] based on the latest developments in e-Learning at the higher education level are being implemented on Phase 2 (2016-2020). There are five patterns can be found in Malaysian e-learning implementation: E-learning policy, E-learning governance, learning management system (LMS), E-learning training and E-learning integration into teaching and learning [10].

Higher education institutions are increasingly being improved to meet the demands of the education sector's development, especially those competing in the Industrial Revolution 4.0, which requires the provision of numerous new education modules that meet consumer needs. To address the shortage of quality education, the government is focusing on providing affordable and convenient education. The regional government has taken steps to encourage online education by issuing new and successful directives for the digitization of textbooks in the academic sector and by providing tablets and laptops to school students. The COVID-19 crisis give Higher Education Institutions (HEIs) in Malaysia an opportunity to rebuild the education system and relook into course learning outcomes. This calls for HEIs in Malaysia to re-examine the purpose of higher education beyond exam. Hence, university teaching and learning models will develop in 10 to 15 years to adapt with the massive growth of the internet.

Technology Acceptance Model

The Technology Acceptance Model (TAM) is used by researchers to investigate the acceptance and readiness of technology. The technology acceptance model (TAM) framework is shown in Figure 1.

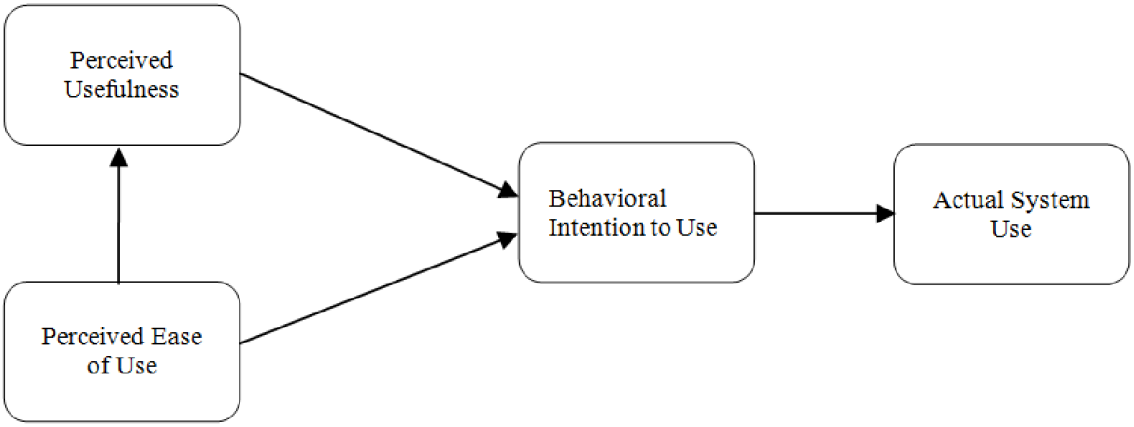

Figure 1. Technology Acceptance Model [11].

Davis (1989) suggested the Technology Acceptance Model (TAM) to analyze the adoption of any new technology mainly due to its robustness and parsimonious nature as a common choice among academics [11]. Researchers' systematic use of the Technology Acceptance Model (TAM) to learn about the adoption of technology and the use of information systems demonstrates the model's effectiveness [12]. TAM has been used as the basis of research into students' e-learning adoption by a number of researchers [13]. According to the TAM, the attitude toward using new technology has a positive impact on the perception that it is simple to use (perceived ease of use-PEU) and that its adoption would result in enhanced efficiency (perceived usefulness-PU). "The degree to which a person thinks that using a device is beneficial to them," according to PU [11]. Perceived Usefulness (PU) is one of the most important precedent factors for the use and application of technology. The relationship of confidence in a program created by people who can boost work performance is referred to as PU [14]. The degree to which people assume that using a device is simple is known as perceived ease of use (PEU). The PEU was the most important

factor in deciding to use the technique. In different contexts and technology implementations, there was a positive relationship between perceived ease of use and system use [15].

RESEARCH DESIGN

Participant

The population selected for this study consisted of diploma architecture student from Politeknik Sultan Abdul Halim Mu'adzam Shah (POLIMAS). The student from semester one until semester six are chosen. The polytechnic student is selected because currently involve with e-learning because of the pandemic situation. Table 1 indicates the total number of students by semester collected from the Sistem Pengurusan Maklumat Politeknik (SPMP).

Table 1 Number of Students Enrolled for Diploma in Architecture, POLIMAS

No.	Institution	Sem 5
1.	Semester 1	26
2.	Semester 2	20
3.	Semester 3	18
4.	Semester 4	25
5.	Semester 5	28
6.	Semester 6	33
Total		150

The data collection began by circulating the target group questionnaires to achieve the sample size of the respondents as given by [16]. The sample size for this study based on [16] based on 150 population is 108. Simple random sampling was used to determine the selected student as a respondent. The survey has been sent to 108 selected students from POLIMAS in the current semester of December 2020 via electronic mail. The Demographic Profile of Respondents shows in Table 2.

Table 2 Demographic Profile of Respondents

Measure	Gender	Frequency	Percent (%)
Gender	Male	47	43.5
	Female	61	56.5
	Total	108	100
Age	18	1	0.9
	19	29	26.9
	20	25	23.1
	21	24	22.2
	22	10	9.3
	23	10	9.3
	24	6	5.6
	25	1	0.9
	26	1	0.9
	34	1	0.9

	Total	108	100
CGPA	0.00 – 2.00	3	2.8
	2.00 – 2.50	11	10.2
	2.50 – 3.00	42	38.9
	3.00 – 3.50	42	38.9
	3.60 – 4.00	10	9.3
	Total	108	100

Research Model and Hypotheses

The following model was proposed from the TAM with an additional e-learning factor and readiness factor as a new construct affecting PU and PEU. Figure 2 shows the research model and hypotheses.

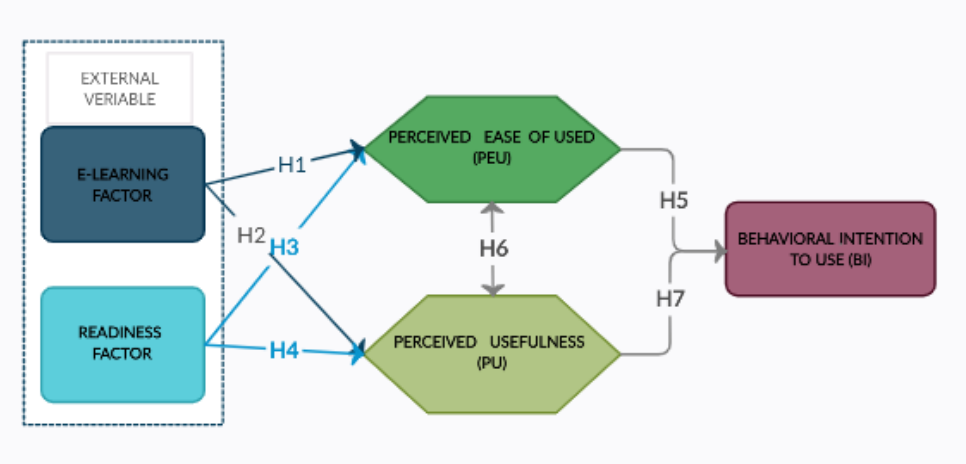

Figure 2. Research model and hypotheses.

E-learning is still viewed as a new, creative mode of learning that provides an organization with a new alternative as well as a new way of solving problems [17]. While education has traditionally been provided in a classroom-based or instructor-led environment, an increasing number of institutions are now using technology to provide education in a new setting. The e-learning aspect is a critical criterion for determining consumer acceptance of technology. Information technology has reshaped the processes of knowledge creation, communication, and dissemination in the educational process [18]. This allows the teacher and the student to be divided in terms of time, place, and space. As a result, successful use of technology in the delivery of course content is critical [19]. Therefore, the following hypothesis suggested:

H1: E-learning factor have a direct positive significance to Perceived Ease of Use (PEU).
H2: E-learning factor have a direct positive significance to Perceived Usefulness (PU).

Several researchers have looked into the role of preparation factors in E-Learning outcomes [20]. Previous research has shown this. One of the most important factors influencing the outcomes of e-learning is technical readiness [21] and matching the right technology with the right learning purpose is crucial [22].

H3: Readiness factor have a direct positive significance to Perceived Ease of Use (PEU).
H4: Readiness factor have a direct positive significance to Perceived Usefulness (PU).

PEU (Perceived Ease of Use) is similar to the expectation of effort in UTAUT [23] and is described as "the degree to which a person assumes that using a particular method will be free of effort" [11]. As a result, the PEU is included to investigate students' assumptions that the system would be simple to use and to predict their behavioral intention to use e-learning systems. It is assumed that if students find the system simple to use, they will agree and use it. As a result, based on several models and previous studies that regard PEU's direct relationship with BI as well as indirectly through PU, we propose the following hypothesis:

H5: Perceived Ease of Use (PEU) will have a direct positive significance on the Behavioral intention (BI) to use e-learning System.
H6: Perceived Ease of Use (PEU) will have a direct positive significance on Perceived Usefulness (PU) of e-learning system.

Perceived Usefulness (PU) is described as "the degree to which an individual believes that using a particular method will enhance his or her job efficiency" [11]. In the context of this paper, PU will be used to investigate students' views of the potential benefits of using the e-learning process. Several research studies have highlighted the important principle that PU plays on BI in the use of e-learning tools [24]. For example, an extended TAM was used to look at the factors that affect whether or not to use an online learning community. They discovered that PU was the most influential factor in predicting the intention to use the web-based learning process. As a result, it is expected that if students believe the e-learning platform is useful and will use it, they will be more likely to follow and use the framework to value their education. Students, on the other hand, may resist educational technologies if they are sceptical of their educational importance. As a result, it is expected that PU will have a significant positive impact on the desire to use the e-learning platform. The researcher then proposed the following hypothesis:

H7: Perceived Usefulness (PU) will have a significant positive effect on the Behavioral intention (BI) to use e- learning system.

The stage in which an individual has established a conscious intent to commit or not commit future actions of a specified type is referred to as behavior intention. The existence of Behavioral Intention (BI) in TAM is one of the major differences from TRA. In the context of information system analysis, system usage has been studied as a dependent variable, and is often determined by only BI (Agarwal & Karahanna, 2000, Szajna, 1994). BI is expected to have a direct impact on predicting how students will accept and use the e-learning framework in the future.

Instrument and Data Collection

Questionnaire survey form is used as an instrument in collecting the data through online platform. The questionnaire is divided into two parts. Part I of the questionnaire collected related demographic data, while Part II used a five-point Likert scale to collect information on the variables mentioned above. For PEU, PU, and BI, [11] previous studies were used. E-learning factor consisted 10 element adapted from previous study by [27] and readiness factor adapted from [20][21] and [22]. The invitations included a brief introduction and a link to a Google Forms web survey. All architecture students at the POLIMAS received invitations via telegram, along with a Google form link to the questionnaire. Because of the global pandemic, all surveys are performed electronically over the internet.

Data Analysis

The IBM Statistical Package for the Social Sciences (SPSS) 25.0 was used to process descriptive and statistical analysis. Descriptive analysis for demographic data and inferential statistic was used to determine the relationship among variables. Furthermore, a linear regression was used

to analyse the study's hypotheses and determine the effect of student readiness in accepting online learning in the current situation.

Measurement Model

If a measurement model is both accurate and valid, it is suitable for model testing, which verifies the measures' reliability as well as their convergent and discriminating validity. For this purpose, the Cronbach Alpha is measured, and as shown in Table 3, the Cronbach alpha value for all constructs is above 0.65, which is higher than the expected rational value of 0.60 [28]. Cronbach Alpha for e-learning factor is 0.908, and Cronbach Alpha for readiness factor is the lowest with 0.782. The perceived usefulness and perceived ease of used Cronbach Alpha are 0.919 and 0.924. The highest Cronbach Alpha is the behavioral intention with 0.944. This ensures that the instrument's reliability is accepted for use.

Table 3 Cronbach Alpha test

Variables	Items	Questions	Cronbach Alpha (>0.60)
E-learning Factor	EF1	I like the idea of e-learning	0.908
	EF2	I think e-learning must be encourage	
	EF3	I feel e-learning is fun	
	EF4	I prefer e-learning lesson	
	EF5	I feel motivated learn with e-learning	
	EF6	I think e-learning is more efficient than conventional class	
	EF7	I am independent learner	
	EF8	I know the basic function of computer	
	EF9	I often use mobile technology	
	EF10	I know how to open several applications at the same time	
Readiness Factor	RF1	I have equipment for e-learning	0.782
	RF2	I have software for e-learning	
	RF3	I have strong internet coverage	
	RF4	My institution makes it mandatory for e-learning	
	RF5	My institution provides e-learning platform	
Perceived Usefulness	PU1	I would find e-learning useful in my learning	0.919
	PU2	Using e-learning enables me to accomplish learning activities more quickly	
	PU3	Using e-learning increases my learning productivity	
	PU4	Using e-learning will increase my chances of getting better grades	
	PU5	Using e-learning make it easier in my learning	
Perceive Ease of Use	PEU1	My interaction with e-learning would be clear and understandable	0.924
	PEU2	It would be easy for me to become skillful at using e-learning	
	PEU3	I would find e-learning easy to use	

	PEU4	It is easy for me to remember how to operate e-learning	
	PEU5	Overall, I find e-learning easy to use	
Behavioral Intention	BI1	I intend to use e-learning in the future	0.944
	BI2	I predict I would use e-learning in the future	
	BI3	I plan to use e-learning in the future	
	BI4	I consider e-learning tools in the future	
	BI5	I am comfortable using e-learning in the future	

Table 4 Correlation between Variables (*n*=108)

Construct	ELF	RF	PU	PEU	BI
ELF	1.000				
RF	0.473**	1.000			
PU	0.767**	0.358**	1.000		
PEU	0.748**	0.422**	0.821**	1.000	
BI	0.746**	0.308**	0.804**	0.768**	1.000

RESULTS AND DISCUSSION

The aims of this study to explore the readiness of students are continuing online learning during this pandemic. Seven hypotheses were tested to determine the student's readiness to use online learning by using the TAM model. Pearson correlation was conducted to examine the bivariate relationships among the variables.

Table 5 Result of Hypotheses Testing

Hypotheses	Standard Path Coefficients	T-Values	Significance	Support
H1: ELF/PEU	0.748	11.602	0.000	Yes
H2: ELF/PU	0.767	12.316	0.000	Yes
H3: RF/PEU	0.422	4.794	0.000	Yes
H4: RF/PU	0.358	3.946	0.000	Yes
H5: PEU/BI	0.768	12.364	0.000	Yes
H6: PEU/PU	0.821	14.832	0.000	Yes
H7: PU/BI	0.804	13.924	0.000	Yes

Hypothesis 1 outline the relationship between the e-learning factor and perceived ease of use among students. Table 5 shows that there is a statistically relationship between the e-learning factor and perceived use among students. ($p<0.05$). The correlation between the e-learning factor and perceived of use is a strong positive relationship ($r=0.748$; $p=0.00$, $p<0.05$). The hypothesis is retained. As for Hypothesis 2, the result shows a statistically significant relationship between the e-learning factor and perceived usefulness ($p<0.05$). The relationship between the e-learning factor and perceived usefulness shows a strong positive relationship ($r=0.767$; $p=0.00$, $p<0.05$). The hypothesis is retained. Hypothesis 3 outlines that the relationship between readiness factor and perceived of use is statistically significant between readiness factor and perceived ease of use ($p<0.05$) and have a weak positive relationship ($r=0.422$; $p=0.00$, $p<0.05$). The hypothesis is retained. As for hypothesis 4, the results show a correlation between readiness factor and

perceived usefulness was statistically significant and have a weak positive relationship (r=0.358; p=0.00, p<0.05). The hypothesis is retained.

Hypothesis 5 shows a correlation between perceived of use and the behavioral intention was statistically significant and has a strong positive relationship (r=0.768; p=0.00, p<0.05). The hypothesis is retained. As for hypothesis 6, the result shows a correlation between perceived ease of use and the perceived usefulness was statistically significant and has a strong positive relationship (r=0.821; p=0.00, p<0.05). The hypothesis is retained. For hypothesis 7, the result shows a correlation between perceived usefulness and the behavioral intention (BI) was statistically significant and has a strong positive relationship (r=0.804; p=0.00, p<0.05). The hypothesis is retained.

According to the result, a significant relationship between the e-learning factor and perceived ease of use tested has existed. The finding is consistent with the TAM model as proposed by [11]. The result indicates that all the hypothesis is supported. It is clearly seen that most of the students' architecture from Polytechnic was entirely ready for the implementation of e-learning during their lesson. This aligns with [21], who highlight that readiness is the most factor influencing individual readiness to use e-learning. As seen here from the result, most students are well prepared for e-learning as a new method to gain knowledge. This e-learning method is student-centered learning; it will enhance student's self-confidence level and motivate them to be independent [27]. The finding from this study, also supported by [24], stated that PU plays an important role towards BI to implement e-learning.

CONCLUSION

The primary contribution of this research paper is the evidence of readiness among architecture students towards the implementation of online learning in Polytechnic. The polytechnic education system works hard to ensure that students can receive the best education even though the COVID epidemic is still critical. Therefore, it is crucial to ensure that students are able and ready to accept online learning at this time so that the education system can continue as well as possible. This research targets architecture students willing to use online learning methods to replace their existing learning methods. The most significant finding of this study is students are well aware and ready to perform online learning. However, though the student prepared for online learning, there are still some difficulties they experience, especially for studio subject. Most of the studio subjects apply practical and technical tasks which still need the traditional method of learning.

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