Expanding the Technology Acceptance Model (TAM) to investigate e-learning usage behavior during the COVID-19 pandemic: Islamic Higher Education Institution (IHEI) context

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Abstract

This study extends the Technology Acceptance Model (TAM) to explore the factors that determine the use of e-learning among Islamic higher education institutions (IHEI) students during the Corona Virus Disease 2019 (COVID-19) pandemic. A survey of 100 students in one of the major Islamic higher education institutions in Indonesia was conducted to examine external factors i.e., personal habit and facilitating conditions which are implemented in the conceptual framework of this research. Partial Least Squares Structural Equation Modeling (PLS-SEM) was used to measure and assess the proposed model. The research findings show that: (1) The expanded TAM-based research model has succeeded in explaining the determinants considered by IHEI students in using e-learning during the pandemic; (2) it is found that there is a significant relationship between personal habit and

perceived usefulness and ease of use; facilitating conditions for the perceived ease of use; perceived ease of use on perceived usefulness; perceived usefulness of intention to use and intention to use of actual usage of e-learning. While the facilitating condition does not show a significant effect on perceived usefulness, as well as perceived ease of use on intention use; and (3) the implications for academic, managerial and further research agendas are also discussed.

Keywords

COVID-19, E-Learning, Islamic higher education institutions

1.　　Introduction

Corona Virus Disease 2019 (COVID-19) is a terrible and most severe global pandemic of this century. WHO (2020) reports that this epidemic has affected more than 93 million people and the death toll is more than 2 million people. In Indonesia, there were 951,651 confirmed cases of COVID-19 with 27,203 deaths (^{Satuan} Tugas Penanganan COVID-19, 2020). The COVID-19 pandemic has caused nearly 120 countries to close faco-to-face learning processes, from elementary schools to higher education institutions (HEI). This step had to be taken to suppress the transmission of the epidemic, although this policy has not been proven effective in minimizing the spread of COVID-19 (Sukendro et al., 2020). With the closure of HEI, the migration of learning methods from conventional ones to using online technology in the form of distance learning is inevitable and several recent studies are discussing this issue (e.g., Wang et al., 2020; Abbasi et al., 2020; Sukendro et al., 2020).

One of the HEI learning technology platforms commonly used during the COVID-19 pandemic is electronic learning (e-learning) (Azlan et al., 2020; Sukendro et al., 2020; Shahzad et al., 2021). In the context of HEI, e-learning systems have been widely used to share information, improve organizational performance (Rosenberg, 2001) and are an important part of modern university curriculum delivery (Paechter et al., 2010). The e-learning system has become a popular and increasingly relevant instrument at HEI because it is able to facilitate the teaching and learning process in a flexible, collaborative, learner-oriented and of course fun (Lee et al., 2013; Mohammadi, 2015). Learning migration using the e-learning system is expected for students and lecturers to be able to significantly improve the quality of knowledge, learning and skills through their learning activities (Omar et al., 2011). Under normal conditions, the e-learning system was developed by HEI management to support face-to-face learning to be more flexible, efficient and effective (Sukendro et al., 2020). However, the COVID-19 pandemic situation has become a lockdown, many schools and universities have made the e-learning platform an important means of teaching and learning continuity, a substitute for the face-to-face classical learning system (Azlan et al., 2020; Sukendro et al., 2020).

E-learning systems cannot provide maximum benefits if users do not fully support them (Abbasi et al., 2020). Referring to the trend of digital competence, educators are encouraged to involve technology in their teaching to facilitate learning or formative assessment tools (Shute and Rahimi, 2017). Given that the use of the e-learning system is driven by "compulsion" during the COVID-19 pandemic, the use of this method in the context of Islamic Higher Education Institutions (IHEI) in Indonesia is still relatively new, so it needs adaptation. For this reason, it is very important to identify the factors that influence students in adopting the e-learning system as an effective learning tool (Sharma and Chandel, 2013). Technology adoption using the Technology Acceptance Model (TAM) (Davis, 1989) is the most common basic theory, even 42 studies have been conducted, 86% using TAM as the basic theory (Sumak et al., 2011). Although TAM has been recognized as an established theory, this very simple model has its drawbacks, especially its deterministic reliability which is still questionable (Bagozzi, 2007). To that end, the researchers proposed an extension model of TAM that fits a particular context (Venkatesh et al., 2003).

According to Venkatesh and Davis (1996), to explain user acceptance and use, it is very important to understand the antecedents of the key TAM constructs, namely perceived ease of use (PEOU) and perceived usefulness (PU). The involvement of external factors (i.e., habit and facilitating conditions) as the main antecedent of TAM constructs is very important, especially to investigate the determinants of the adoption of the e-learning system at IHEI during the pandemic, which is a new and unfamiliar media. Users' decision to continue using Internet-based learning technology is only because of "habit" behavior, not conscious considerations (Rafique et al., 2020). Thus, there is a need to investigate the role of personal habit as an antecedent of the core constructs of TAM (PEOU and PU) as proposed by researchers (e.g., Hubert et al., 2017; Rafique et al., 2020). On the other hand, facilitating conditions are factors to ensure the system is able to run properly and reliably. Facilitating condition refers to the individual's belief that the use of a new system or technology is supported by organizational resources and the availability of technical facilities (Venkatesh et al., 2003). For this reason, investigations on the role of facilitating conditions as predictors of TAM's core constructs in supporting the successful use of e-learning systems are very important because they have been verified by researchers (e.g., Aggelidis and Chatzoglou, 2009; Sukendro et al., 2020). In short, expanding TAM by involving personal habit constructs and facilitating conditions as external factors is believed to be able to increase the predictive power of investigations into the use of e-learning systems during the COVID-19 pandemic, especially in Indonesia in an IHEI setting that has never been found. Therefore, this study aims to determine the factors that predict the use of e-learning systems through path analysis of IHEI students and lecturers in Indonesia using the expanded TAM model as a guiding academic model to understand the relationship between exogenous and endogenous constructs formed.

2.   Literatur review

2.1. E-learning and the COVID-19 Pandemic

E-learning provides considerable benefits and opportunities for students to study anywhere and anytime (Baytiyeh, 2018). Several studies show that e-Learning is equivalent to traditional learning in acquiring knowledge and skills; even learning that integrates e-Learning systems with traditional methods can effectively be well received by students and educators (George and Lal, 2019). On this basis, the Indonesian government encourages the use of the E-Learning system as the only distance learning during school closures due to the COVID-19 outbreak. Due to the massive use of the E-Learning system in various higher educations during the COVID-19 pandemic, several problems that arise are the unpreparedness of students to adopt e-learning so that it has a negative impact on their academic achievement; most lecturers are also not ready to deliver lectures effectively from home (Moorhouse, 2020). The use of E-learning is suggested to adapt to the learning conditions and the approach used (Burgos et al., 2007). The impact of e-learning greatly affects the performance of education stakeholders, namely educators and students (Ramírez-Correa et al., 2019). Finally, the acceptance of e-learning systems by users during a pandemic must be seriously considered, because the indicator of the success of an information system depends on the utilization of the system by users (Almaiah and Almulhem, 2018).

2.2. E-learning and extending the parsimony of TAM

In the context of understanding technology adoption behavior, the Technology acceptance model (TAM) introduced by Davis et al (1989) became the most widely used model (Teo et al., 2018), especially e-learning adoption behavior, even reaching 86% (Sumak et al., 2011). In the TAM model, the user's acceptance or rejection of technology is heavily influenced by the constructs of PEOU and PU (Davis, 1989); and both constructs are influenced by external factors (Al-Ammary et al., 2014; Abdullah and Ward, 2016; Salloum et al., 2019). The results of studies on e-learning conducted by academics (e.g. Lee et al., 2014; Liu and Hwang, 2010) show that the extended TAM model is able to provide better explanatory power ranging from 52% up to 70%. Therefore, many researchers extend TAM with different external factors to support the acceptance or use of e-learning (Cheung and Vogel, 2013).

Because TAM has recognized its credibility, this model is extended and widely used in higher education, especially for investigating the acceptance or use of e-learning systems during the COVID-19 pandemic at sports education schools in Indonesia (Sukendro et al., 2020); higher education in Vietnam (Ho et al., 2020); higher education in India (Pal and Vanijja, 2020); higher education in Poland (Rizun and Strzelecki, 2020). However, TAM has not been properly extended in the context of the adoption of the learning system at IHEI, especially the involvement of

external habit constructs and facilitating conditions, because the use of e-learning as an online learning system during the COVID-19 pandemic is a new thing that is imposed, it needs habituation and strong infrastructure support to ensure the sustainability of system adoption by users (Venkatesh and Bala, 2008; Venkatesh et al., 2012).

3.   Research model and hypothesis development

This study explores the factors predicting the use of e-learning during COVID-19 among students in the context of the Islamic Higher Education Institution (IHEI) based on the expanded TAM framework. The proposed framework model with eight hypotheses is shown in Figure 1. Habit is the first external variable that is positioned as an antecedent of the core construct of TAM. The author considers a construct that represents a reflexive system (i.e., habit) as described by Bergeron et al., (1995) about habits in the use of information systems. In the theory of interpersonal behavior (TIB), Triandis (1977) argues that "habits" are a series of behavior-situations that are being or have become automatic, so that they occur without any personal instructions. Habitual constructs in TIB can present automatic and unconscious stimuli to evoke an impulse to an action (Gardner, 2015). While Limayem et al. (2007) argues, "Habits" are defined as the extent to which people tend to perform behaviors automatically due to learning. Habits have been shown to be a critical factor predicting technology use (Kim and Malhotra, 2005; Limayem et al., 2007). In the context of students and educators at IHEI, personal habits in using the e-learning system during the Covic-19 pandemic were able to create positive perceptions of the core constructs of TAM (PEOU and PU). This is also evident in the results of a study conducted by Hubert et al., (2017), habit has been shown to have a strong effect on PE and PEOU in m-shopping users in Denmark; Likewise, Rafique et al., (2020) proved its consistency in a study of mobile library application users in Pakistan. Furthermore, the proposed hypotheses are:

H1. Personal habits have a significant positive effect on the perceived ease of use of e-learning IHEI

H2 Personal habits have a significant positive effect on the perceived usefulness of IHEI e-learning.

Furthermore, the external construct that becomes the antecedent of the core construct of TAM is the facilitating condition. This construct refers to the extent to which a person believes that the existing organizational infrastructure and technical support is capable of supporting the use of the system (Venkatesh et al., 2003). According to Triandis (1980), it is possible that a person has the intention to do something but is unable to do it because the environment hinders the action. Consequently, facilitating conditions are an important factor in explaining individual behavior and must be taken into account. Operationally, facilitating conditions are the extent to which IHEI students and educators believe that organizational resources and technical support are able to support the use of the e-learning system during the pandemic. So, this has implications for the core construct of TAM

as the results of a study on the use of e-learning in the Indonesian sport science education context (Sukendro et al., 2020). Previously, facilitating conditions were reported to significantly predict PEOU perceptions on the integration of educational technology (Muhaimin et al., 2019) and PU on Web 2.0-based personal learning (Rahimi et al., 2015). Then the hypothesis is,

H3 Facilitating conditions on IHEI have a positive effect on perceived ease of use of the e-learning system during the pandemic.

H4 Facilitating conditions in IHEI positively affect the perceived usefulness of the e-learning system during the pandemic.

PEOU is defined as the degree to which a person believes that using a particular system will free him from effort (Davis, 1989); and is a driver of acceptance of new technology-based applications (Venkatesh, 2000). In adopting the e-learning system at IHEI, PEOU is considered as one of the main variables of TAM which is interpreted as how much confidence users (students and educators) have in the ease of the e-learning system to support teaching and learning activities during the COVID-19 pandemic. The effect of perceived ease of use on the intention to use e-learning applications has also been confirmed by several previous studies (e.g., Liu et al., 2010; Sumak et al., 2011; Chen and Tseng, 2012). On the other hand, the greater the perceived ease of use of the e-learning system, the more positive the intention to use it; so, it is more likely to be used. In addition, perceived ease of use is assumed to have an indirect effect on intention to use through perceived usefulness in the context of e-learning (Chen and Tseng, 2012). Perceived ease of use is expected to have an indirect effect on user intentions through perceived usefulness. In other words, the effect of perceived ease of use on e-learning systems directly has a positive impact on perceived usefulness as proven by previous researchers (e.g., Mohammadi, 2015; Rizun and Strzelecki, 2020; Sukendro et al., 2020). So, the proposed hypothesis,

H5. Perceived ease of use of the e-learning system at IHEI positively affects students' intentions to use the e-learning system

H6 The perceived ease of use of the e-learning system at IHEI also has a positive impact on perceived usefulness during the pandemic.

Perceived usefulness refers to the extent to which a person believes that using a particular system will improve his or her work performance (Davis, 1989). In the context of the application of the e-learning system at IHEI, students and educators believe that using the e-learning system during the COVID-19 pandemic can improve their performance. The results of empirical studies (e.g., Ramírez-Correa et al. 2015; Mohammadi, 2015; Sukendro et al., 2020) confirm a strong relationship between Perceived usefulness and intention to use e-learning. Likewise, previous researchers (e.g., Sumak et al., 2011; Chen and Tseng, 2012) have consistently confirmed this relationship. In short, the greater the perceived usefulness of the e-learning system at HEI, the more positive the intention to use it or the more likely it is to be used during a pandemic. Then the hypothesis is,

H7 The perceived usefulness of the e-learning system at IHEI during the

COVID-19 pandemic positively affects the intention to use IHEI students.

Finally, intention plays an important role in the actual use of new technologies (Davis, 1989). In this study, intention is defined as the intention of students and educators at IHEI to use the e-learning system as a teaching-learning medium during the COVID-19 pandemic. Venkatesh et al., (2003) asserted, there is a positive relationship between intention to use and actual use. In the context of the study of adoption of e-learning systems during the covid-19 pandemic, the intention to use has a significant relationship to the actual use of e-learning as in the study of adoption of e-learning at Qassim University and King Abdualaziz University KSA (Alkhalaf et al., 2012), Hong Kong Polytechnic University (Chow et al., 2012), universities in Spain and Chile (Ramírez-Correa et al., 2015), and Sports Science Education in Indonesia (Sukendro et al., 2020). Based on these arguments, then:
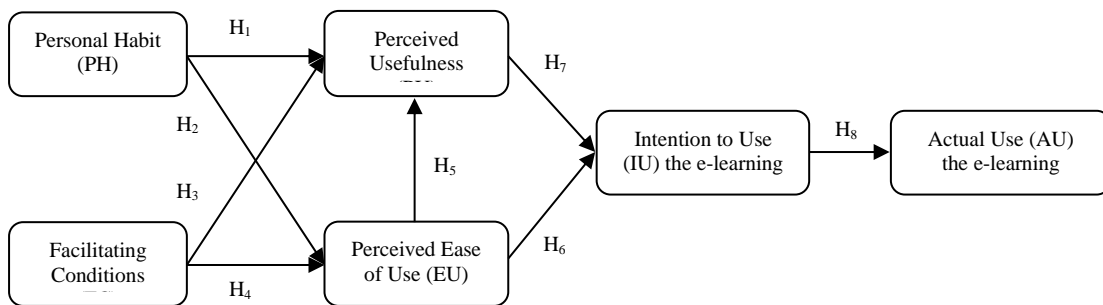

Figure 1. The research model of the present study.

H8 Intention to use the e-learning system has a positive influence on the actual use of e-learning during the COVID-19 pandemic.

4.   Method

An empirical study of an Islamic Higher Education institution (IHE) in one of the major cities in Indonesia became the focus of attention because it was forced to apply e-learning in teaching and learning during August to October 2021 due to the official closure of schools by the Indonesian government since May 20, 2020. The educational institution was chosen because the author has a long work experience and understands a good academic culture at the institution. This institute offers good studies to understand the acceptance of e-learning among students from different regions and helps to avoid geographic bias in the results. Our questionnaire uses items adopted from previous literature such as facilitating conditions (Venkatesh et al., 2003), personal habit (Limayem and Cheung, 2011), perceived ease of use and usefulness (Mohammadi, 2015), intention to use (Park et al., 2014) and actual use (Cheng, 2010). Each item was revised and adjusted to suit the purpose of this study. We adopted a five-point Likert scale for our analysis: ranging from (1) Strongly Disagree to (5) Strongly Agree. This is to avoid confusion among the respondents, which can improve the quality of the responses. Online questionnaires (google form) were given to students spread across the country through WhatsApp Groups to facilitate the distribution of questionnaires. Measurement and assessment of the model was carried out using Partial Least Squares Structural Equation Modeling (PLS-SEM). The final survey managed to

collect 100 undergraduate and master's students. Table 1 summarizes the main characteristics of the respondents. The proportion of female respondents (57%) is more dominant than male respondents (43%). Most of them are <20 years old (67%), Bachelor's education level is the dominant respondent (95%) and the majority of the study period is 1 year or new students (67%).

Table 1. Demographic information of respondents

Variable		Frequency	Percentage (%)
Gender	Male	43	43
	Female	57	57
Age (years)	< 20	67	67
	20 - 23	13	13
	24 - 27	10	10
	28 - 31	8	8
	> 31	2	2
Education level	Bachelor	95	95
	Postgraduate	5	5
Study period (year)	1	67	67
	2	3	3
	3	10	10
	4	10	10
	>4	10	10

5.   Results

5.1. Measurement model

Convergent validity of the formed model can be seen through factor loading, average variance extracted (AVE) and composite reliability (CR) (Fornell and Larcker, 1981). In Table 2, the CR values of all constructs are greater than 0.6 (Hair et al., 2014); factor loadings more than 0.5 (Hair et al., 2010); and AVE values above 0.5 (Fornell and Larcker, 1981). This shows that the model formed has satisfactory convergent validity (Hair et al., 2014). There are two approaches used to assess discriminant validity (c.f. Fornell and Larcker, 1981), first, checking the value of the cross loadings indicator in Table 3, in which no indicator loads were higher than any opposing construct (Hair et al., 2012); and second, the square root of AVE for each construct should exceed the intercorrelations of the construct with other model constructs as recommended by Fornell and Larcker (1981) (see Table 4). The results both confirm the discriminant validity of all constructs.

5.2. Structural model results

PLS-Graph 3.0, which allows for the explicit estimation of latent variable scores, and the bootstrapping resampling method were used to test the proposed model (Chin, 1998). Eight hypotheses showing a direct relationship between constructs were tested by comparing t-statistics with t-table values (1.96). As a result, there are two rejected hypotheses and six accepted hypotheses as shown in Table 5. As shown in Figure 2, H1 which states that PH positively affects PU is proven to support the hypothesis ($\beta = 0.399$; t = 3.781). The same thing also happened to PH which positively affected the EU (H2 = 0.641; t = 8.471), FC positively affected the EU (H4 ; $\beta = 0.303$; t = 3.721), H5 which stated that PU was positively influenced by the EU ($\beta = 0.525$; t = 5.079), PU has a positive

effect on IU (H7 ; β = 0.774; t = 10.098) and H8 which states that IU has a positive effect on AU (β = 0.568; t = 5.343), all of which are proven to support the hypothesis. Surprisingly, H3 which stated that PU was positively influenced by FC (β = -0.007; t = 0.092) and H6 EU had a positive effect on IU (β = 0.164; t = 1.954) did not confirm the hypothesis.

Table 2. Convergent validity and reliability assessment

Construct	Indicator	Loading factor	AVE	CR	CA
Actual use (AU)	AU1	0.917	0.811	0.945	0.923
	AU2	0.898			
	AU3	0.887			
	AU4	0.902			
Ease of Use (EU)	EU1	0.939	0.808	0.955	0.940
	EU2	0.923			
	EU3	0.841			
	EU4	0.910			
	EU5	0.879			
Facilitating condition (FC)	FC1	0.852	0.700	0.875	0.786
	FC2	0.839			
	FC3	0.819			
Personal Habit (PH)	PH1	0.912	0.819	0.931	0.889
	PH2	0.937			
	PH3	0.865			
Intention use (IU)	IU1	0.942	0.837	0.939	0.903
	IU2	0.918			
	IU3	0.885			
Perceived usefulness (PU)	PU1	0.866	0.796	0.965	0.957
	PU2	0.893			
	PU3	0.839			
	PU4	0.883			
	PU5	0.930			
	PU6	0.910			
	PU7	0.922			

Note: AVE (Average Variance Extracted), CR (composite reliability), CA (Cronbach Alpha)

Table 3. Discriminant validity (cross loading)

Construct	AU	EU	FC	PH	IU	PU
AU1	0.916	0.629	0.563	0.672	0.773	0.710
AU2	0.897	0.573	0.473	0.548	0.701	0.632
AU3	0.886	0.627	0.476	0.614	0.626	0.646
AU4	0.901	0.686	0.547	0.700	0.663	0.675
EU1	0.624	0.938	0.764	0.803	0.730	0.774
EU2	0.580	0.923	0.753	0.772	0.714	0.764
EU3	0.624	0.840	0.592	0.722	0.657	0.717
EU4	0.628	0.910	0.707	0.749	0.746	0.764
EU5	0.680	0.879	0.616	0.809	0.787	0.849
FC1	0.414	0.594	0.851	0.599	0.503	0.515
FC2	0.484	0.673	0.838	0.584	0.617	0.649
FC3	0.534	0.642	0.818	0.620	0.559	0.533
PH1	0.676	0.766	0.615	0.911	0.734	0.777
PH2	0.614	0.738	0.656	0.936	0.698	0.733
PH3	0.621	0.822	0.678	0.864	0.741	0.780
IU1	0.694	0.760	0.607	0.746	0.941	0.841
IU2	0.647	0.688	0.614	0.711	0.917	0.768
IU3	0.766	0.770	0.625	0.742	0.884	0.792
PU1	0.704	0.812	0.643	0.812	0.772	0.866
PU2	0.615	0.800	0.650	0.755	0.773	0.892
PU3	0.688	0.689	0.504	0.739	0.692	0.838
PU4	0.643	0.741	0.589	0.754	0.802	0.883
PU5	0.665	0.778	0.651	0.768	0.825	0.930
PU6	0.620	0.782	0.624	0.704	0.799	0.910
PU7	0.695	0.780	0.584	0.750	0.802	0.922

Note: Actual use (AU); Ease of Use (EU); Facilitating condition (FC); Personal Habit (PH); Intention use (IU); Perceived usefulness (PU)

Bold values mean the items belong to 1 research dimension

Table 4. Discriminant validity with Fornell–Larcker criterion

Konstruk	AU	EU	FC	PH	IU	PU
Actual use (AU)	0,852					
Ease of Use (EU)	0.698	0,855				
Facilitating condition (FC)	0.574	0.764	0,825			
Personal Habit (PH)	0.705	0.859	0.719	0,820		
Intention use (IU)	0.770	0.810	0.673	0.802	0,842	
Perceived usefulness (PU)	0.741	0.863	0.681	0.845	0.876	0,838

Note: Diagonal elements are AVE square root (shown in bold diagonally) and factor correlation matrix

6.   Discussion

Efforts to predict the use of e-learning during the COVID-19 pandemic through the extended TAM model have succeeded in explaining the process of e-learning adoption felt by students at the Islamic Higher Education Institution (IHEI) Indonesia. The results of the study show that the scale used can be reviewed and adapted by other researchers in the future who are interested in conducting similar research, especially during a pandemic (such as COVID-19) using virtual media as a learning instrument among IHEI students. Through content validity and measurement models, the model is reported to be valid and reliable. Previous studies used similar measures to test the scale (e.g. Sukendro et al., 2020; Muhaimin et al., 2019; Ramírez-Correa et al., 2015).

Using the bootstrap method of 5,000 sub-samples, this study reveals that personal habits that show personal automation in using e-learning media during the COVID-19 emergency positively increase perceived usefulness and perceived ease of use. This fact shows that online learning media for the majority of students are already familiar and used to it so that the presence of online learning with e-learning media is more useful and easier. This finding is consistent with the results of previous studies (e.g., Hubert et al., 2017; Rafique et al., 2020).

Facilitating conditions as the belief that organizational and technical resources exist to support the use of e-learning during the COVID-19 emergency have a significant relationship with perceived ease of use. It can be concluded that adequate facilities, a good environment and easy internet access will make it easier for IHEI students to use e-learning during the lockdown. Under normal conditions, facilitating conditions are reported to significantly affect perceived ease of use (Sukendro et al., 2020; Muhaimin et al., 2019). However, oddly enough, there is an insignificant relationship between the facilitating condition and perceived usefulness in the IHEI context. This proves that the environment and resources for using e-learning are not able to increase the beneficial impact of benefits during the COVID-19 pandemic for IHEI students. This result is consistent with previous findings (e.g., Muhaimin et al., 2019) which stated that the predictive power of the facilitating condition factor was not significant on perceived usefulness in the Web 2.0 integration process. Regarding perceived ease of use, the findings of this study report that it significantly predicts perceived usefulness; when e-learning is perceived as user friendly, students receive the benefits of e-learning media during COVID-19. Similar reports from previous researchers confirmed these findings

(Mohammadi, 2015; Zhang et al., 2008). Perceived ease of use is also reported not to have a strong relationship with students' intention to use e-learning media. This is because students are not fully ready to use e-learning as a learning medium in the era of restrictions on community mobility due to the internet network that is not always available in the student's domicile area and lack of familiarity with the system. The correlation between perceived usefulness and intention to use was found to be very significant. Another study in e-learning integration also reported that when respondents feel that technology is beneficial for learning activities, the intention to use it will be more likely to be increased (Nikou and Economides, 2017; Teo et al., 2018).

Table 5. Hypothesis testing results

Hypothesis	Relationship	Original Sample	Standard Error	T Statistics	Conclusion
1	PH -> PU	0,399	0,105	3,781	Supported
2	PH -> EU	0,641	0,075	8,471	Supported
3	FC -> PU	-0,007	0,081	0,092	Unsupported
4	FC -> EU	0,303	0,081	3,721	Supported
5	EU -> PU	0,525	0,103	5,079	Supported
6	EU -> IU	0,164	0,083	1,954	Unsupported
7	PU -> IU	0,774	0,076	10,098	Supported
8	IU -> AU	0,568	0,106	5,343	Supported

Note: Significant if the t-statistics is greater than t-table 1.96

Actual use (AU); Ease of Use (EU); Facilitating condition (FC); Personal Habit (PH); Intention use (IU); Perceived usefulness (PU)

In addition, the higher the respondent's intention to use e-learning during COVID-19, the higher their actual use of learning to use the tool. Finally, intention to use was reported to be significant in predicting actual use of e-learning during COVID-19 which is supported by the findings of previous researchers (e.g., Ramírez-Correa et al., 2015; Teo, 2009). They also revealed that behavioral intention is a key predictor for the use of e-learning during the teaching and learning process. Efforts to make students more comfortable using technology during a pandemic such as COVID-19 must always be encouraged.
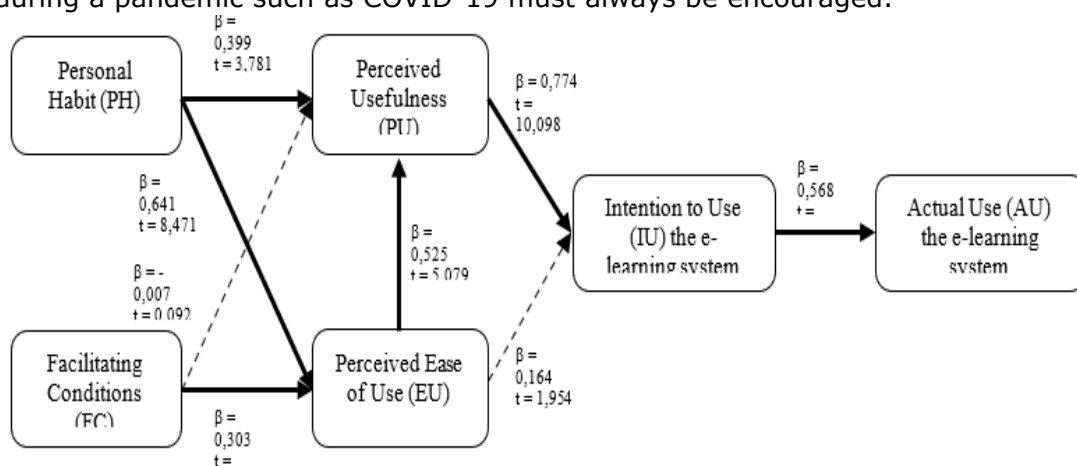

Figure 2. Result of structural model

Note

———————————> Significant

- - - - - - - - - -> Not Significant

7.   Conclusion

TAM has been widely applied to explore the use of e-learning in higher HEI under normal conditions (Mohammadi, 2015; Zhang et al., 2008). There is still limited research investigating the use of e-learning during the COVID-19 pandemic, indicating that the current study can enrich the academic literature in understanding the condition of distance learning during school closures due to the pandemic and serve as an important map for future studies. The policy of school closures and restrictions on community movement, forcing students to use e-learning requires an adaptation process and of course cannot be avoided. Therefore, it is important to invest resources to ensure that e-learning-based learning remains available and reliable in the long term. The current study which focuses on the use of e-learning media as a student learning method at IHEI during the COVID-19 pandemic shows that most of the main constructs of TAM are significantly correlated (except facilitating conditions to perceived usefulness; perceived ease of use to intention use). In addition, this study also provides information that in the aspect of access, not many students have adequate technological resources related to facilitation conditions, especially internet access. Stakeholders must be better prepared to face distance learning that occurs due to a prolonged outbreak.

Although many quantitative data have been described in full, this research cannot be separated from several limitations. First, the respondents involved in this study were only IHEI students from one university, so more respondents with different backgrounds were needed for further research. Second, another interesting recommendation for future research is to understand the use of e-learning using a qualitative approach through interviews or group discussions to reveal the obstacles faced by students when using e-learning media, so that comparative studies are recommended. Finally, users of e-learning media are not only from students but also from lecturers. For this reason, a comparative study of the two groups of respondents is highly recommended to provide a broader perspective.

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Declarations

Author contribution statement

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