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E-LEARNING CONTINUANCE INTENTION IN MALAYSIA: WHAT DETERMINES?

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ABSTRACT

This study investigates the factors determine the e-learning continuance intention among learners in Malaysia. A total of 414 learners from public and private universities responded to the structured questionnaire. The data collected was analyzed using the partial least squares-structural equation modelling. Perceived usefulness, perceived ease of use and subjective norms were found affecting continuance intention of the e-learning learners. Both perceived usefulness and perceived ease of use also mediated the relationships among the variables tested. The findings of this study revealed that perceived usefulness was a significant indicator of continuance intention. Therefore, strategies need to be designed to optimize the usefulness of the system and to consider the direct and indirect significant indicators of perceived usefulness to promote continuance intention of e-learning system among learners in Malaysia. This study extends the knowledge on e-learning continuance intention by including subjective norms in addition to perceived usefulness and perceived ease of use in the technology acceptance model to explain behavioural intention. This study also incorporates the effect of system characteristics to user beliefs in explaining continuance intention.

INTRODUCTION

The e-learning platforms are growing important, especially during the COVID-19 pandemic. Students are homebound and makes online learning the only option (Kurniawati, 2020). E-learning is environmentally-friendly (Tseng & Chen, 2015) and is time flexible, customized to learners and feasible for

free quality resources (George & Lal, 2019). In Malaysia, one of the key initiatives of Higher Learning Institutions (HLIs) is to make online learning an integral component (Ministry of Education Malaysia, 2015). However, the online platforms have yet optimized (Kurniawati, 2020). Most of the learners use e-learning platform to download learning materials or use it as an information transmission tool (Mtebe, 2015). The COVID-19 pandemic grants good opportunity for the HLIs to revise and improve the effectiveness of the current online teaching and learning system (Kurniawati, 2020). As HLIs have invested in building the infrastructure, the benefit gained from using e-learning platform is a concern (Panigrahi, Srivastava, & Sharma, 2018). Even though the initial step to achieve e-learning system success lies on the user's acceptance with respect to the system, the actual success is to create continuous usage of the system (Lee, 2010). The investigation of the continuance intention may need in-depth study on the system characteristics with relation to the determinants of continuance intention (Zheng, Zhao, & Stylianou, 2013).

The motivation stimulus comprises technology's usefulness and convenience that shape the users' adoption intentions (Lai, 2017) and are categorized as personal factors (Panigrahi et al., 2018). Moreover, the limited or missing piece of personal touch of instructor is another challenge to enroll and engage students (Panigrahi et al., 2018). To enhance student participation, the presence of collectivistic society in Malaysia (Hofstede Insights, 2020) makes environment factor interesting in the context of Malaysia. Subjective norms are found affecting the intention to use e-learning in Malaysia (Hussein, 2018). Personal belongingness develops relationship bonding that converts to distinguished quality discussions (Shih & Huang, 2014). Social environment factors such as parents, peers, teachers and mass media, contribute to the growth and formation of an individual (Arifin, Wahab, Teh, & Otman, 2018). Din and Haron (2012) revealed that Malaysian online social networking users were willing to share their knowledge and they also gained benefit from the interaction with friends and family members in a way to close the communications gap. Thus, to fill the research gap, this study combines personal factors and environment factor in determining the user continuance intention. Different with Davis (1993), this study analyzes the indirect relationship between system characteristics and continuance intention by including perceived usefulness and perceived ease of use as mediators. The mediation analysis is extended to explore the indirect relationship between subjective norm and continuance intention via perceived usefulness.

LITERATURE REVIEW

User Beliefs, Subjective Norms and Continuance Intention

Technology acceptance model (TAM) proposed by Davis (1989) uses individual's beliefs such as perceived usefulness and perceived ease of use to explain behavioral intention. These user beliefs determine the ways users value the use of e-learning platform in this study. Panigrahi et al. (2018) had

highlighted the lack of personal touch in e-learning. This suggests the role of social influence to enhance participation. Din and Haron (2012); Shih and Huang (2014) and Arifin et al. (2018) pinpointed the impact of social influence and thus this environment factor plays a role in determining behavioral intention (Panigrahi et al., 2018). Moreover, if a user perceives less effort in using a system, this will enhance the use of a system to increase task performance (Venkatesh & Davis, 2000). In addition, an individual will perceive a system as useful when an important referent thinks that an individual should use a system via internalization (Venkatesh & Davis, 2000). As a result, we develop the followings hypotheses:

H1: Perceived usefulness is positively related to continuance intention.

H2: Perceived ease of use is positively related to continuance intention.

H3: Subjective norms are positively related to continuance intention.

H4: Perceived ease of use is positively related to perceived usefulness.

H5: Subjective norms are positively related to perceived usefulness.

System Characteristics and User Beliefs

Davis (1993) included system design as external stimulus affecting cognitive response such as perceived usefulness and perceived ease of use. On the contrary, system characteristics were found impacting continuance intention indirectly via perceived individual benefit and user satisfaction (Zheng et al., 2013). Thus, we tends to explore the mediating effect of user beliefs between system characteristics and continuance intention by using the three system characteristics recommended by Pituch and Lee (2006), namely system functionality (flexible access to lesson and assessment media that allows learners to perform different learning activities), system interactivity (interactions between instructors and learners or learners and learners) and system response (response time of e-learning platform). Alsabawy, Cater-Steel, and Soar (2016) have found that information technology (IT) infrastructure and IT quality determining perceived usefulness of e-learning system. System functionality and system interactivity that are the infrastructure-oriented variables are proposed to affect perceived usefulness in this study. On the other hand, Venkatesh (2000) found that control that can be an enabler or a constraint of the behavior such as the facilitating condition affected perceived ease of use in TAM. Control includes knowledge, resources and opportunities to deliver a specific behavior (Venkatesh, 2000). Thus, system response is proposed to affect perceived ease of use in this study. Based on the relations, we hypothesize that:

H6: System functionality is positively related to perceived usefulness.

H7: System interactivity is positively related to perceived usefulness.

H8: System response is positively related to perceived ease of use.

Mediating effects of user beliefs

The key two beliefs in the TAM model is proposed to be the mediators in this study. The study of Eraslan Yalcin and Kutlu (2019) found that the relationships were direct for external factors and technology use. However, previous studies such as Pituch and Lee (2006) and Al-Okaily, Alqudah, Matar, Lutfi, and Taamneh (2020) have revealed that mediating effects existed in the relationships between external factors and technology use. Motivated by the findings of previous studies, this study aims to discover the direct and indirect relationships between system characteristics and user beliefs. Different with the study of Pituch and Lee (2006), the proposed mediation effect of perceive usefulness is heighten by incorporating the external effect from subjective norms. Subjective norms are included as one of the determinants of continuance intention to cater the context of Malaysia culture. Therefore, we posit that:

H9: Perceived ease of use mediates the relationship between system response and continuance intention.

H10: Perceived ease of use mediates the relationship between system response and perceived usefulness.

H11: Perceived ease of use and perceived usefulness mediate the relationship between system response and continuance intention.

H12: Perceived usefulness mediates the relationship between system functionality and continuance intention.

H13: Perceived usefulness mediates the relationship between system interactivity and continuance intention.

H14: Perceived usefulness mediates the relationship between subjective norms and continuance intention.

Based on the hypotheses developed, the research framework of this study is presented in **Figure 1**.

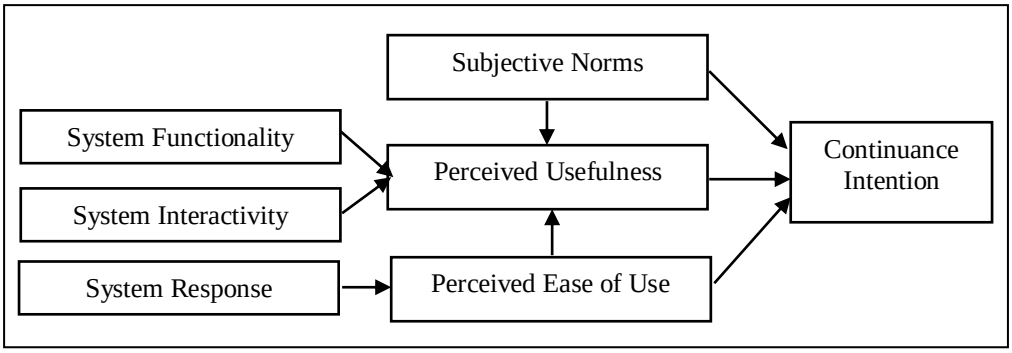

Figure 1 Research framework

METHODOLOGY

Purposive sampling was used to select the respondents from public and private universities in Malaysia by setting a filtering question to ensure they were taking at least one subject in current semester. Given the maximum predictors were four, the minimum sample size calculated using G*Power was 85 with 80 percent power and effect size of 0.15. The self-administrated online questionnaires were distributed to the respondents. The questionnaire consisted of three sections, in which the first section was questions regarding the profile of respondents. The second and third sections of the questionnaire were designed using measurements of constructs adapted from reliable resources: Perceived usefulness and perceived ease of use from Davis (1989), subjective norms from Cheung and Lee (2010), system functionality and system interactivity from Pituch and Lee (2006), system response from Bailey and Pearson (1983) for second section and continuance intention from Roca, Chiu, and Martínez (2006) for third section. The scale for the measurements were designed in the 5-point Likert Scale that 1 indicated strongly disagree while 5 denoted strongly agree. The data collection started on the ninth week after the semester commenced and ended on the eleventh week. After data cleaning, a total of 414 sets of questionnaires were used for the analysis.

The data collected was tested for the common method bias using Harman's Single Factor test. The value of the sums of squared loadings was 34.69 percent, which was below the 50 percent benchmark. Therefore, common method bias could be eradicated. We also performed the permutation-based significance test to identify the significant difference between Public University and Private University groups. The permutation test results confirmed there is no significant difference between Public University and Private University groups for the structural model as the Permutation p-values were greater than 0.5. The results were further supported by the results of measurement invariance (MICOM) tests. The results for both compositional invariance and scalar invariance tests were not significant and thus indicated full measurement invariance. Pooling is recommended when majority of the structural effects are invariant (Henseler, 2016). Therefore, both Public University and Private University groups were combined for the analysis.

ANALYSIS AND RESULTS

Among 414 respondents, 152 males and 262 females had responded. The respondents from public universities were 209 while private universities were 205. 138 respondents spent more than 20 hours online per week, followed by 6 to 10 hours (96 respondents), 11 to 15 hours (92 respondents), 16 to 20 hours (64 respondents) and 5 or less than 5 hours (24 respondents). In terms of the knowledge of using computer, 190 respondents were good, 167 respondents were average, 49 were excellent and 8 were poor. Assessment of measurement model was then carried out to check indicator loadings, composite reliability (CR) and average variance extracted (AVE) of the constructs.

Table 1. Reliability and convergent validity of the model				
Construct	**Item**	**Loadings**	**CR**	**AVE**
Perceived Ease of Use (PEOU)	PEOU1	0.842	0.886	0.721
	PEOU2	0.867		
	PEOU3	0.838		
Perceived Usefulness (PU)	PU1	0.854	0.927	0.718
	PU2	0.867		
	PU3	0.849		
	PU4	0.814		
	PU5	0.852		
Subjective Norms (SN)	SN1	0.956	0.954	0.912
	SN2	0.954		
System Functionality (SF)	SF1	0.716	0.885	0.562
	SF2	0.765		
	SF3	0.757		
	SF4	0.769		
	SF5	0.749		
	SF6	0.741		
System Interactivity (SI)	SI1	0.894	0.903	0.757
	SI2	0.889		
	SI3	0.826		
System Response (SR)	SR1	0.849	0.900	0.751
	SR2	0.875		
	SR3	0.876		
Continuance Intention (CI)	CI1	0.889	0.914	0.779
	CI2	0.898		
	CI3	0.860		

Table 1 showed the indicator loadings were ranged from 0.716 to 0.956, which exceeded the threshold value of 0.708 (Hair, Hult, Ringle, & Sarstedt, 2017). The values of CR and AVE for all constructs also exceeded the threshold values of 0.7 and 0.5, respectively. All constructs fulfilled the requirements of reliability and convergent validity.

Table 2. Discriminant validity of the model							
	CI	PEOU	PU	SF	SI	SN	SR
CI							
PEOU	0.568						
PU	0.577	0.749					
SF	0.55	0.695	0.699				
SI	0.511	0.487	0.477	0.593			
SN	0.589	0.426	0.474	0.4	0.54		

SR	0.525	0.46	0.419	0.607	0.589	0.401	

Heterotrait-Monotrait (HTMT) ratio was employed to check the discriminant validity of the model. Table 3 exhibited that all values satisfied the HTMT.85 criterion of Kline (2011). Thus, the discriminant validity was achieved.

Table 3. Path coefficient and hypothesis testing

Hypothesis	**Relationship**	**Beta**	**t-value**	**Confidence Interval**		f^2	R^2	Q^2	**Supported**
				LL	**UL**				
H1	PU -> CI	0.231	4.163	0.142	0.325	0.048	0.392	0.286	Yes
H2	PEOU -> CI	0.202	3.443	0.104	0.297	0.039			Yes
H3	SN -> CI	0.346	7.593	0.268	0.418	0.158			Yes
H4	PEOU -> PU	0.385	8.702	0.312	0.457	0.198	0.524	0.351	Yes
H5	SN -> PU	0.165	3.710	0.091	0.238	0.042			Yes
H6	SF -> PU	0.322	6.325	0.237	0.403	0.127			Yes
H7	SI -> PU	0.024	0.495	-0.057	0.106	0.001			No
H8	SR -> PEOU	0.379	7.803	0.299	0.462	0.167	0.143	0.098	Yes
H9	SR -> PEOU -> CI	0.077	2.944	0.030	0.131				Yes
H10	SR -> PEOU -> PU	0.146	5.795	0.099	0.197				Yes
H11	SR -> PEOU -> PU -> CI	0.034	3.378	0.016	0.055				Yes
H12	SF -> PU -> CI	0.074	3.222	0.034	0.124				Yes
H13	SI -> PU -> CI	0.006	0.465	-0.016	0.033				No
H14	SN -> PU -> CI	0.038	2.902	0.015	0.066				Yes

Assessment of the structural model started with the checking of collinearity. All values for variance inflator factor (VIF) were less than 3.3 benchmark value of Diamantopoulos and Siguaw (2006) and thus there was no collinearity issue. Next, path coefficient analysis was utilized to assess the significance or relevance of the relationships among the variables. Perceived useful ($\beta = 0.23$, $p < 0.01$), perceived ease of use ($\beta = 0.20$, $p < 0.01$), and subjective norms ($\beta = 0.35$, $p < 0.01$) were positively related to continuance intention. In addition, perceived ease of use ($\beta = 0.39$, $p < 0.01$), subjective norms ($\beta = 0.17$, $p < 0.01$), and system functionality ($\beta = 0.32$, $p < 0.01$) were positively related to perceived usefulness while system interactivity and perceived usefulness was not significant. There was a positive significant relationship between system response and perceived ease of use ($\beta = 0.38$, $p < 0.01$). When perceived ease of use mediated the relationship between system response and continuance intention, the relationship was significant ($\beta = 0.08$, $p < 0.01$). Perceived ease of use also mediated the relationship between system response ($\beta = 0.15$, $p < 0.01$) and perceived usefulness. Significant relationship also existed when perceived ease of use and perceived usefulness mediated the relationship between system response and continuance intention ($\beta = 0.03$, $p < 0.01$). The mediating effect of perceived usefulness was significant between system functionality ($\beta = 0.07$, $p < 0.01$) and continuance intention as well as between subjective norms ($\beta = 0.04$, $p < 0.01$) and continuance intention. The mediating effect of perceived usefulness was insignificant between system interactivity and continuance intention.

The results of the coefficient of determination (R^2) indicated that the predictive accuracy was 0.39 (substantial), 0.14 (moderate) and 0.52 (substantial) for continuance intention, perceived ease of use and perceived usefulness following Cohen (1988). The results of R^2 also designated that a total of 14, 39, and 52 percent of the variation in perceived ease of use, continuance intention, and perceived usefulness, respectively, was explained by its independent variables. Using f^2 effect of Cohen (1988), medium effect presents in the relationships between subjective norms and continuance intention; system response and perceived ease of use; and perceived ease of use and perceived usefulness. Small effect presents in the relationships between perceived usefulness and perceived ease of use and continuance intention as well as between system functionality or subjective norms and perceived usefulness. System interactivity had no effect on perceived usefulness. In terms of the predictive relevance (Q^2), all values were greater than zero indicated that independent constructs had predictive relevance for dependent constructs (continuance intention, perceived ease of use, and perceived usefulness). The Importance Performance Matrix Analysis was performed to identify the importance and relative performance of the constructs. Figure 2 presented the IPMA analysis map. The IPMA analysis results showed that system interactivity, system functionality, and system response had the above average performance values but below average importance values. Conversely, perceived usefulness, perceived ease of use, and subjective norms possess the above average importance and performance values.

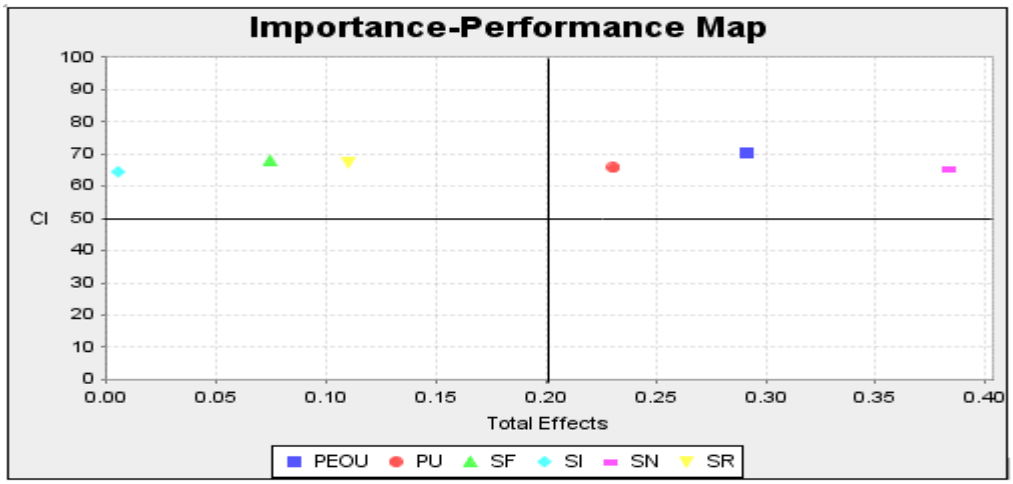

Figure 2 IPMA analysis map

DISCUSSIONS AND CONCLUSION

Based on the findings, perceived usefulness directly affects the continuance intention. The results are consistent with the findings of Lee (2006). The learners believe that the use of e-learning system will improve their task or learning performance. Perceived ease of use also determines the e-learning continuance intention directly and indirectly via perceived usefulness, which is also consistent with the findings of Lee (2006). Thus, if students find that e-learning system is useful to them, they also expect the e-learning system should be easy to use and free of effort. In addition, subjective norms was found directly affect the e-learning continuance intention, which was inconsistent with the finding of Lee (2006). Subjective norms also indirectly affect the continuance intention via perceived usefulness, which is consistent with the finding of Lee (2006). This is because e-learning is a tool that is necessary for a learner and thus the influence of referents does not make a different when a learner use it voluntarily (direct relation) or by instruction or expectation (indirect relation). If the referents such as instructors or peers think that the learners should use the e-learning system, the learners will be motivated to meet the expectations of their referents. There is a possibility that the learners tend to correspond to the expectation of group members with the aims to strengthen relationships and to avoid a punishment (Goodwin, 1987). Therefore, the referents affect the way learners perceive e-learning as useful and their continuance intentions.

System functionality is found directly affecting the perceived usefulness and indirectly affecting continuance intention via perceived usefulness. The findings are tallied with the results of Pituch and Lee (2006). Learners will perceive the e-learning system as useful when the system enables the flexibility in the access of instructional and assessment media. However, system interactivity is not significant in determining the usefulness of e-learning system. The finding is inconsistent with the study of Pituch and Lee (2006). Although the function for interactions is available in the system, the learners are motivated to use e-learning system due to the influence of their

referents. System response showed indirect impact on perceived usefulness via perceived ease of use. System response is found to affect perceived ease of use and is supported by the study of Pituch and Lee (2006). The learners will perceive the e-learning system as easy to use by evaluating how fast, consistent and reasonable is the response time of the system. Perceived ease of use will subsequently lead to the usefulness and continuance intention of the e-learning system. Based on the findings and discussions, perceived usefulness is the most important determinant of the continuance intention of e-learning system among the learners in both public and private HLIs. The IPMA analysis showed the learners treat system functionality, system interactivity and system response as less important although the system is well-functioned and well-responded.

CONTRIBUTIONS AND IMPLICATIONS

Theoretically, this study extends the knowledge on the determinants of e-learning continuance intention by using mediation analysis and by incorporating subjective norms in addition to user beliefs in TAM to consider the social context of Malaysia. Practically, some areas of improvement can be proposed based on the findings of this study. The prior concern will be to enhance the usefulness of the e-learning system to promote continuance intention. Firstly, training can be conducted to the instructors to optimize the functions in the e-learning system and they are encouraged to use the functions in the system. Briefing also can be conducted to the learners to create awareness on the functions of the system as well as to demonstrate the ways to use the system. Secondly, system functionality refers to flexibility to access, in which mobile application can be developed to enhance mobile access in addition to the website access. Thirdly, the interface of the e-learning system needs to be designed in a more user-friendly manner reduce the hassle to use the system. Fourthly, the time response of the e-learning system needs to be taken care of by HLIs. Therefore, the maintenance of the system needs to be done and the support of bandwidth will be important. Fifthly, instructors can employ the instructional approaches that incorporate the teamwork for learners. The usage of e-learning system by their peers in a team will have the influence on them. Besides, as an instructor can be a potential referent, the increase in the usage of the system by instructor will trigger learners to use the system more frequently. Finally, IPMA analysis showed the learners perceive system functionality, system interactivity and system response as less important although e-learning system possesses such features. The HLIs need to create the awareness on learners about the performance of the system that can support their learning. For instance, the HLIs must ensure that the problem of time lagging is minimized when there are many users using the system concurrently.

LIMITATIONS AND FUTURE STUDIES

This study focuses on the learner's perspective on continuance intention of the e-learning system. To have a more comprehensive view on the e-learning system implemented by HLIs, future study can consider the instructor perspective in examining the continuance intention. This study investigates

specifically on the scope of e-leaning system implemented by the HLIs. Future research can venture into the facilities perspectives of e-learning system. For instance, the importance of internet coverage (Lim, 2020) to motivate the learners to use e-learning system.

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