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Research Article

Enhancing Students' Online Engagement Among Online Distance Learning Institutions' Students in Malaysia. The Role of Digital Readiness as a Mediator

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Abstract

This study evaluates the relationships between e-learning attitude, digital readiness and online engagement among online distance learning students in ODL higher education institutions in Malaysia. The structural equation (SEM) technique was employed to assess the relationship between e-learning attitudes and the influence of digital readiness mediating online engagement. The model was developed based on the conceptual development and subsequently analysed by adopting Partial Least Square (PLS). A total of 307 students completed the online survey. Statistically, the data analysis outcomes have clearly shown that all four suggested hypotheses developed in this study are positive and significant. The results showed that e-learning attitudes influence digital readiness while e-learning attitude and digital readiness influence students' online engagement. At the same time, digital readiness influences the relationship between e-learning attitudes and online engagement among students in Malaysia from higher institutions. As a result, to encourage students in higher education to engage in their online studies, this study is relevant to the higher education practice in developing their online courses.

Keywords: e-Learning Attitude, Digital Readiness, Online Engagement, Online Distance Learning

1. Introduction

The COVID-19 pandemic, which began in 2020, had a significant impact on higher education. In a relatively short period, universities all over the world have developed and launched online distance learning courses. By understanding how new technology can be used for academic achievement in university life, university students are increasingly demanding that traditional lectures be available online (Goode, 2010). Higher education institutions' e-learning environments incorporate digital technology into teaching and learning activities and serve as a major educational innovation forum for advancing technology-enabled platforms (Eze et al., 2018). There are constant changes in education with all aspects of the Internet's presence and growth, interactive, participatory media, and higher education educators are mainly influenced by these changes (Haythornthwaite & Andrews, 2011). Besides, higher education institutions must also obtain adequate knowledge and use it creatively and innovatively in their teaching activities (Daud & Khalid, 2014).

Despite the development of digital technologies in learning in the online learning environment, engagement has been critical. Due to today's trend of switching from the face-to-face classroom to web-based systems, certain concerns need to be discussed. 78% of students fail to complete their online courses by full online learning (Simpson, 2020). While quality standards have been developed for online courses' format and organisation, universities are still wondering what activities contribute to online students' learning engagement. Students' Failures in online courses were primarily due to their passive engagement (Kuzilek et al., 2015).

More than fifty per cent of the publications reviewed in their thematic study found that the word engagement was mentioned (Halverson et al., 2014). Therefore, this paper aims to analyse the impact of e-learning attitudes on digital readiness, e-learning attitudes and digital readiness on online engagement, and the mediating effect of digital readiness between e-learning attitudes and online engagement.

Although a study found that students accept technology as digital natives and are eager to use technology in their learning, despite being so-called "digital natives". According to the findings, Malaysian students do not utilise much technology in their teacher-directed learning. Technology is primarily used for social networking purposes. This finding is consistent with findings from previous studies in the other context of West and Asia (Thang et al., 2014). Although Japanese students are well-versed in technology, they do not utilise it to formally study English or any other subject (Lockley, 2013).

2. Research Questions

Based on the above research problem, the following research questions were developed for this study:

1. Does e-learning attitude have a positive and significant influence on digital readiness?
2. Do e-learning attitude, and digital readiness have a positive and significant influence on online engagement?
3. Does digital readiness mediate the relationship between e-learning attitude and online engagement?

3. Research Objectives

Three research objectives were developed for this study:

1. To evaluate whether e-learning attitudes have a positive and significant influence on digital readiness.
2. To evaluate whether e-learning attitudes and digital readiness have a positive and significant influence on online engagement.
3. To assess whether digital readiness mediates the relationship between e-learning attitude and online engagement.

4. Literature Review

Online Engagement

In the online learning environment, student engagement is consistently identified as a key predictor of the outcomes. If higher education institutions decide to use digital technology for e-learning, participant participation and engagement factors are key to improving education quality. In such a way, integrated learning meets a comprehensive learning approach (Redmond et al., 2018). Student engagement is an important element for the standard of the higher education student experience. (Hampton & Pearce, 2016) stated that it is essential for success to be focused and engaged in coursework as an online student. Student engagement refers to the amount of energy and effort students put forth in their learning environment that can be measured in various ways, including behavioural, cognitive, and affective measures. It is formed by various structural and internal forces, such as the dynamic interaction of experiences, learning practises, and the learning environment. The more students get involved and motivated in their learning environment, the more likely they are to redirect energy into learning and produce a range of short and long term results which can increase engagement. (Bond et al., 2020).

However, the engagement of students appears to be difficult to define and describe. The Learning and Teaching Centre of Macquarie University (2009) described engagement as "the degree or quality of students' engagement" and to engage positively in their learning. Also, student engagement is characterised as the level of effort or interaction between the time or resources of learning that develops the learning outcome and experience (Lewis et al., 2011). Student engagement is also a measure of the quality of education and successful learning in classes (Robinson & Hullinger, 2008). Scholars accept that students' dedication is central to higher education success (Murray.J., 2018). When students are highly involved in their learning, they will boost their academic achievements, such as critical thinking and grades, learning, and applying the information gained to real life (Carini et al., 2006).

A study has shown that most online students are non-traditional students who balance the conflicting requirements of work, life, and study and choose to study online for convenience (Chen et al., 2010); (Thompson et al., 2013). Literature findings (Oblinger, 2003; Krause, 2006) found that university students prefer online study because it provides flexibility. It also allows them to balance their academics with other

external responsibilities. For lecturers seeking to optimise online students' participation, these two elements are critical considerations for course design and pedagogy. Online research requires modifications to the teaching and learning methods typically associated with the university learning environments. Online domains are typically "characterised by various traditions, identities and]knowledge". There was a link between students' achievement and the services they used in online settings. (Crampton et al., 2012).

E-learning Attitude

The term for e-learning and online learning is used interchangeably. E-learning attitude is described as students' attitude as "the impression of students participating through computer use in e-learning activities." (Sun et al., 2008); (Sun et al., 2008). E-learning attitude is characterised as the degree to which students perceive the students' actions in e-learning as favourable or unfavourable (Ajzen, 1991).

A study has found that students have a positive attitude towards distance learning online, which indicates that they are more likely to accept it as a form of education. Most of them use ICT in their daily lives and consciously use ICT in their education. It could be concluded that students' key aspirations are linked to an efficient online learning environment with integrated technology to provide online communication between students, the submission of online assignments, and the teacher's online support (Peytcheva-Forsyth et al., 2018). Students' attitudes to online learning are also connected to students' previous experience using computers (Selim, 2007).

Moreover, students' attitude towards the Internet is also important in evaluating students' motivation, interest, and success in online learning (Yang & Lin, 2010). (Purarjomandlangrudi, 2018) suggests that student's attitude towards online learning has a very important effect on their interaction and participation online. Suppose students have a better attitude towards this term. In that case, they will increase their acceptance of e-learning and will be able to interact more with online programs and courses. Students became more positively towards e-learning due to their prior e-learning attitudes and motivation in learning (Yue ZHU et al., 2013). However, a study indicated no substantial correlation between students' interest in technology, the usefulness of computers for students, and the ease of using online learning at the undergraduate level. With less awareness of students' online learning, slow and relatively modest internet facilities also negatively affect online learning (Ullah, 2017).

Digital Readiness

Higher education technology advancements can help increase students' engagement with faculty members and other college students (NSSE, 2013). Students can access a wide range of digital technologies, including learning management systems, e-portfolios, and plagiarism detection software, as well as personal tools like word processors, spreadsheets, presentation tools, e-mail, search engines, and messengers (Goode, 2010); (Henderson et al., 2015). Students can use a variety of digital technologies, including educational support systems like learning management systems, plagiarism detection software, and electronic portfolios, as well as personal tools like word processors, spreadsheets, presentation, e-mail, search engines, and messengers (Goode, 2010); (Henderson et al., 2015).

In terms of technology's role, the NSSE found that technology learning and courses improved students' comprehension, and the use of technology was correlated positively with academic student learning. Commitment includes higher-order learning, reflective and inclusive learning, and learning techniques ((NSSE), 2013). Students continue to participate in courses by implementing digital technology for digital students who naturally are technologically competent due to their exposure to a technologically rich environment (Jones, 2012).

Students from universities that are anticipated to be digital natives will be introduced to the university's e-learning settings to improve their academic performing skills at the beginning. Technology is something more than an instrument for digital natives because it is considered a way of life. According to a study, higher education students appear to be prepared for digital learning on average. This study also indicated two groups of students that were significantly different when it comes to their readiness for digital learning related to technological equipment, previous experiences with e-learning, and digital learning skills (Händel et al., 2020).

5. Research Hypotheses

Hypotheses for this study were developed based on the hypotheses development as follows:

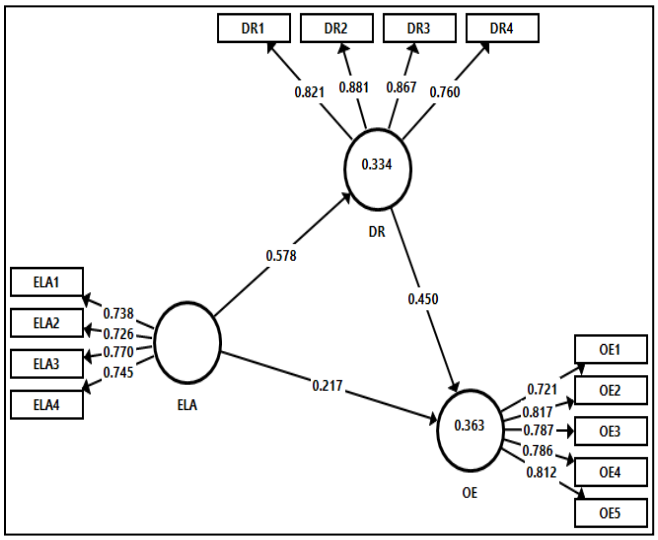
1) There is a positive and significant influence of e-learning attitude on digital readiness.

2) There is a positive and significant influence of digital readiness on online engagement.

3) There is a positive and significant influence of e-learning attitude on online engagement.

4) There is a positive and significant influence of digital readiness mediates between e-learning attitude and online engagement.

1. Research Model



6.. Research Methodology

Approach, Design & Software

The research model of this study consisted of e-learning attitude, digital readiness and online engagement. The measures of e-learning attitude (independent variable) were adopted from (Chu & Chen, 2016), digital readiness (mediator) taken from (Hong & Kim, 2018) and online engagement (dependent variable) adopted from (Dixson, 2015). All the items of the three variables were developed in the context of online distance learning in Malaysia. This study employed primary data to develop a quantitative approach to research. All the thirteen indicators representing their latent variable were gauged by utilising Likert scales starting from strongly disagree to agree strongly. It was to allow the majority of the respondents 'response rate and response quality and minimise the "frustration level" of the respondents (Babakus & Boller, 1992); (Sachdev & Verma, 2004). Before the key analysis, the data were filtered by employing SPSS 18. According to Hair, Hult, Ringle, & Sarstedt (2017), partial least squares–structural equation modelling (PLS-SEM) was deemed the main approach for data assessment. In order to analyse the data for this study, the SmartPLS 3 software (Ringle, Wende, & Becker, 2015) was adopted.

Sample

The aim of this study was on online distance learning students in Malaysia. Online distance learning students referred to ODL students studying at the diploma, degree, master, and doctorate level. Data collection involved three ODL higher institutions in Malaysia who were selected randomly. The online version instruments were e-mailed to 425 students from three ODL institutions in Malaysia. Altogether, 321 students (response rate=75.52%) had answered the survey. Since this study has adopted a variance-based approach for data analysis, and after considering that there was no customary minimum amount of response rate of response to e accepted in the online survey (Hamilton, 2003), the sample was sufficient to be analysed. Then, the data screening technique proposed by Field (2013) was adopted. This follows by the use of SPSS 18 to re-assess any outliers that exist in the data. By performing this procedure, 14 outliers were spotted and deleted before performing the key analysis. Hence, the PLS-SEM algorithm was performed over all the samples of 307 respondents in ODL higher institutions context.

7. Data Analysis

Table 1: Respondents' Profile

	Frequency	Percentage
GENDER		
MALE	211	68.7
FEMALE	96	31.3
AGE		
<30 YEARS	99	32.2
31-40 YEARS	105	34.2
41-50 YEARS	77	25.1
51-60 YEARS	18	5.9
>60 YEARS	8	2.6
YEAR STUDY		
ONE	71	23.1
TWO	137	44.6
THREE	49	16.0
FOUR	26	8.5
FIVE	14	4.6
MORE THAN YEAR FIVE	10	3.3
LEVEL		
DIPLOMA	14	4.6
BACHELOR	109	35.5
MASTER	174	56.7
DOCTORATE	10	3.3
EMPLOYMENT		
PUBLIC SECTOR	66	21.5
PRIVATE	191	62.2
OWN BUSINESS	18	5.9
UNEMPLOYED	32	10.4
MARITAL STATUS		
SINGLE	126	41.0
MARRIED	169	55.0
DIVORCED	12	3.9

Common Method Bias

According to (Kock, 2015) and (Kock & Lynn, 2012), the complete collinearity test is a comprehensive method for the simultaneous assessment of vertical and sideways collinearity. The variance inflation factors (VIFs) higher than 3.3 indicated pathological collinearity, and it also signalled the problem of common method bias of the model. Hence, if the full collinearity test VIFs are less than 3.3, it is assumed that the model poses no common method. Table 2 depicted the full collinearity test VIFs, which was less than 3.3 and consequently, no issue of common method bias was presented.

Table 2: Full Collinearity (VIF) Test

	ELA	OE	DR
ELA		1.398	1.285
OE	1.433		1.285
DR	1.433	1.398	

Note: ELA= E-Learning Attitude DR=Digital Readiness OE=Online Engagement

Evaluation of Reflective Measurement Model

The steps suggested by Hair et al. (2017) were adopted to evaluate each of the measurements in the first order and second-order measurement models. By conducting these steps, 2 items with low loading were spotted and deleted from the framework in online distance learning higher education institutions in Malaysia. Once these indicators were deleted, all the statistical numbers threshold were attained to verify the developed model's reliability and validity. Meanwhile, the items factor loading shave been shown in Figure 1. Table 3 summarised the results of Cronbach's alpha, composite reliability, and convergent validity estimation of the proposed model. These estimates proved there was no issue in confirming internal consistency.

Furthermore, all the Average Variance Extracted (AVE) figures were higher than 0.5, signifying the existence of convergent validity (Hair et al., 2017) for every variable in the framework. Discriminants validity too was evaluated by conducting Hetrotrait-Monotratit (HTMT) ratio analysis is a recommended criterion for evaluating discriminant validity through Variance-Based Structural Equation Modeling (VB-SEM as suggested by (Henseler et al., (2015). Table 4 depicted the HTMT ratio figures of the variables regarding the sample that being analysed, and 95% confidence intervals (two-tailed) have been obtained, suggesting the confirmation of discriminant validity on HTMT 0.85 and the upper level of the Bias-Corrected and Accelerated bootstrap confidence intervals were less than 1.

Table 3: Construct Reliability & Validity

Constructs	**Items**	**Loadings**	**CA**	**rho_A**	**CR**	**AVE**
Digital Readiness	DR1	**0.821**	0.853 (0.814, 0.883)	0.861 (0.827, 0.891)	0.901 (0.878, 0.919)	0.695 (0.644, 0.741)
	DR2	**0.881**				
	DR3	**0.867**				
	DR4	**0.760**				
E-Learning Attitude	ELA1	**0.738**	0.734 (0.660, 0.790)	0.735 (0.662, 0.794)	0.833 (0.795, 0.864)	0.555 (0.493, 0.613)
	ELA2	**0.726**				
	ELA3	**0.770**				
	ELA4	**0.745**				
Online Engagement	OE1	**0.721**	0.845 (0.808, 0.875)	0.855 (0.824, 0.885)	0.889 (0.865, 0.909)	0.617 (0.564, 0.667)
	OE2	**0.817**				
	OE3	**0.787**				
	OE4	**0.786**				
	OE5	**0.812**				

Note: Confidence interval computed based on percentile bootstrapping test with 10000 sub-samples and at 5% confidence level. A two-tail test

Table 4: Hetrotrait-Monotrait (HTMT) Ratio

Constructs	Digital Readiness	E-Learning Attitude
E-Learning Attitude	0.719(0.603, 0.824)	
Online Engagement	0.663(0.565, 0.747)	0.594(0.464, 0.710)

Note: A two-tail percentile bootstrap test at 5% confidence interval (2.5%, 97.5%) with 10,000 sub-samples were performed.

Structural Model

The guiding principle of Hair et al. (2017) was utilised to estimate the structural model in this study and to determine the path coefficients significantly. Table 5 depicted the results of hypotheses testing. H_1 proposed there is a positive relationship between e-learning attitude and digital readiness, and the statistical analysis end result confirmed that e-learning attitude had influenced positively and significantly digital readiness (ß = 0.578, t = 12.965, p=0.000); hence, H_1 was supported. The statistical result of H_2 as well demonstrated there was a significant and positive relationship between digital readiness and online engagement (ß = 0.450, t = 8.368, p=0.000), hence supporting H_2. H_3 also confirmed that e-learning attitude has a positive and significant influence on online engagement (ß = 0.217, t = 3.725, p=0.000); therefore, H_3 was supported as well. Subsequently, the indirect relationship hypothesis was tested, and the statistical result was depicted in Table 5. H_4 result too established that there was a positive and significant mediating effect of digital readiness on e-learning attitude and online engagement relationship (total indirect effect= 0.260, t = 6.905, p=0.000); hence H_4 was supported. Moreover, the zero is not astride between lower-level confidence of the interval (LLCI=0.193) and upper-level confidence interval (ULCI=0.336), which further confirmed the significance of the mediating effect.

Table 5: Hypotheses Testing

Direct Path	Path Coefficient	T Statistics	P Values
H1: ELA -> DR	0.578	12.965	0.000 (*Supported*)
H2: DR -> OE	0.450	8.368	0.000 (*Supported*)
H3: ELA -> OE	0.217	3.725	0.000 (*Supported*)
Indirect Path	Total Indirect Effect	T Statistics	P Values
H4: ELA -> DR -> OE	0.260	6.905	0.000 (*Supported*)

8. Discussion

The data analysis results clearly show that digital readiness influences the relationship between e-learning attitude and online engagement among online distance learning higher institutions 'students in Malaysia. The study results found something interesting due to data analysis. Many ODL students say that e-learning attitude is an important factor in engaging in online engagement while learning effectively. Therefore, it is essential to ensure that ODL institutions ensure that students have the right attitude towards e-learning. The university may be able to provide courses or workshops related to e-learning so that students can form a positive attitude towards e-learning. ODL higher institutions must emphasise efforts to encourage ODL students to form attitudes to master information technology skills by further enhancing their skills and knowledge. Lecturers who teach ODL students must also take the initiative to help their students form student attitudes in e-learning. The development of e-learning worldwide and the concept of learning without borders online has made learning opportunities more and more open.

Therefore, to encourage students to gain knowledge most effectively, students need to prepare themselves with a positive and accommodative attitude to ensure that the knowledge that will be received does not face any obstacles. Internet technology has helped the development of online lessons in helping students. Technology has also helped create many continuous learning opportunities, such as online distance learning. Students' attitude towards the e-learning environment is a factor that influences student's engagement online, where they can control their learning and use functions that can help them better engage with their lecturers. The lecturer needs to form good communication with the students so that it will indirectly stimulate the students to be more positive to engage with the lecturer online. Students who go through a good and positive experience with lecturers online will be more likely to engage more frequently with their lecturers. In addition to students having the right attitude towards e-learning, students also need to have a high digital readiness level. Students must have confidence and be prepared to face the very dynamic technology environment. To have a high level of

digital readiness, students need to equip themselves with all the knowledge and skills of technology so that their learning process will be more effective.

Digital readiness is vital in ensuring that online engagement will be more effective with lecturers in every subject taken by students. Students need to ensure and realise that digital readiness is an essential element to enable students to engage with lecturers. From the statistical results above, it is clear that e-learning attitude has a positive and significant influence on online engagement. With the introduction of digital readiness as a mediator, the relationship between e-learning attitude and online engagement is strengthened. The total indirect effect between e-learning attitude and digital readiness and digital readiness and online engagement is 0.578 * 0.450 = 0.260. Therefore, academics involved in online teaching need to pay serious attention to ensure that there is a response from students to engage with lecturers to ensure that students can undergo the learning process effectively. Emphasis should be placed on forming an e-learning attitude and always be sensitive to changes in the technological environment and enable online engagement to be done by students; digital readiness plays a very important role in mediating the relationship between e-learning attitude and online engagement so that learning outcomes online will work best as expected.

9. Limitation And Future Direction

This study uses a convenience sampling technique to collect the data. However, there are some benefits to using convenience sampling techniques. It simplifies the collecting other data constraints process, such as not being able to generalise. Another limitation is a time constraint, which is the constraint to perfect an academic paper's requirements. This paper is gathered in parallel with academic research efforts originated from time constraints. Therefore, the lack of time for data collection makes it possible to collect and analyse it. Hence, it is suggested that for future study, a longitudinal study should be done to allow an extensive period to collect data and perform data analysis. This will permit more conclusive findings and more thorough implications can be made. It should focus much attention on the most intricate constructs that affect online engagement, such as time management support and motivation.

10. Conclusion

The core of this study is the e-learning attitude, digital readiness, and online engagement among online distance learning students in Malaysia's online higher education institutions. The statistical findings indicated an influence of digital readiness that mediates the relationship between e-learning attitude and online engagement. Statistically, it is confirmed that all four proposed hypotheses developed in this study are found to be positive and significant. ODL higher institutions' lecturers must be able to influence the online engagement of their students by initiating and promoting an appropriate e-learning attitude. Receptive towards e-learning attitude should be promoted in the online class. Online students must acquire online technology as much as possible to be ready to participate and be involved in online engagement in their online study.

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