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The Determinants of the Effectiveness of Open and Distance Learning (ODL) during the COVID - 19

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Abstract
The COVID-19 pandemic has caused accounting education to drastically change the teaching and learning methods from the traditional method to the Open and Distance Learning (ODL) method. The switch between the teaching and learning processes of the ODL method has created a problem regarding the effectiveness of the ODL, especially during this COVID-19. Thus, this study is conducted to identify the factors that have an impact on the effectiveness of ODL to ensure the process of ODL is going effectively and efficiently. At the same time the aims of this study are to enhance the stakeholders of higher education institutions in managing the ODL process and make effective decisions towards the effective teaching and learning process. Therefore, two variables are being analyzed, which are the hardware and software provision and interaction. A quantitative approach was used, and data were collected through an online survey using a Google Form. The respondents are full time students enrolled in undergraduate accounting course from Universiti Teknologi Mara (UiTM) located in Malaysia and the sample size is 375 students. The IBM SPSS version 27 and Partial least squares regression (PLS regression) which is WarpPLS version 7.0 was used to analyze the data. The results show that the provision of hardware and software, as well as their interaction, had a significant positive impact on the effectiveness of ODL during COVID-19. Further investigation showed that the hardware and software provision and interaction are the main determinant on the effectiveness of ODL. The findings of this study have significant value for higher education institutions, faculties, lecturers, and students. Future research could be applied to the others higher education institution using the qualitative approach and focuses on the other variables.
Keywords: Effectiveness of ODL, COVID-19, Hardware and Software Provision, Interaction.

Introduction

The COVID-19 pandemic has proven to be one of the most dangerous and deadly health crises of the twenty-first century. The deadly COVID-19 virus had shown up uninvited and shook the world, forcing drastic changes in people's lives (Mathew & Chung, 2020). Unfortunately, the

pandemic had a negative impact on economy, social and political sectors of this country, Malaysia. The education field was one of the affected areas and as a result, many educational institutions were forced to close in order to protect people.

All the higher education institutions had to immediately change the teaching and learning process from face-to-face to open and distance learning (ODL) by using any available method and tools. The students and lecturers had to prepare themselves mentally and physically to adopt to these drastic changes. Universiti Teknologi Mara (UiTM) was one of the higher education institutions that implemented ODL as the main method for the teaching and learning process. The process of teaching and learning was conducted online from home. During ODL, the lecturers and students preferred using devices like smartphones and laptops. Most commonly used applications and software used during ODL to facilitate interactions between students and lecturers are WhatsApp, Telegram, Google Meet, and Google Classroom.

However, the effectiveness of ODL became a concern as more classes were held in this manner. There were students and lecturers undergoing their first ODL classes for the first time, making it quite difficult for them to adapt to this new environment. Moreover, according to Otukile (2011), the majority of students had a high failure rate and dropped out during ODL due to the unfamiliar environment and additional challenges during the learning process. Additionally, the higher education institutions were not aware of the effectiveness of ODL and also there was a perception of society, that students and lecturers especially for higher education institutions were not able to adopt the new method easily.

This study was conducted during the COVID-19 pandemic and aims to investigate the factors of effectiveness of ODL. The findings will result in improving the performance of students and to assist a successful teaching and learning process. This study only focuses on the impact of the hardware and software provision and interaction on the effectiveness of ODL.

Theoretical Background

Connectivism is a well-known learning theory and the most prominent characteristics of connectivism are interaction and connection. Connectivism learning theory was introduced by two theorists, (Downes, 2005; Siemens, 2005). The theory was first published in two articles ‘Connectivism: Learning as a Network Creation’ by Siemens, published online in 2004 and ‘An Introduction to Connective Knowledge’ by Downes, published in 2004. These publications look into the significance of technology in the educational process and how the digital age has accelerated students' access to information. Connectivism accepts technology as a major factor in our learning process.

This theory promotes the idea that learning can successfully happen through digital channels, including social media, forums, videos and blogs (Goldie, 2016). The theory stated that connectivism begins when an individual turns to digital technology to solve a problem, thus is relevant with this study to examine the hardware and software and interaction on the effectiveness of open and distance learning.

Literature Review and Hypothesis

Effectiveness of Open and distance Learning (ODL) during COVID-19

Open and distance learning (ODL) is defined as learning that was accessible, flexible, and online learning (Evans, 1995). According to UNESCO (2002), ODL are approaches that focus on increasing access to higher education and training provision, liberating learners from time and place constraints, and providing individuals and groups of learners with flexible learning

opportunities. ODL was at least as good as traditional education and will continue to be innovative, effective and convenient (Jung & Latchem, 2007). The latest ODL platform was rapidly expanding as a result of the technological advancement especially the advancement of the Internet and the World Wide Web (Ghosh et al., 2012). In this era of COVID-19, the education field was affected and subsequently the accounting education too was affected. Therefore, accounting education became more challenging and had to face the new environment of teaching and learning.

Since the new norm, lecturers and students were unable to proceed with face-to-face learning method and ODL had become a main platform for teaching and learning process as COVID-19 cases continue to spread. This was supported by Mathew & Chung (2020) where ODL has been used in universities all over the world for decades and with the COVID-19 pandemic, its implementation has been accelerated globally at an unprecedented rate. At the same time, according to Musa et al (2020) because of the COVID-19 pandemic, online distance learning (ODL) has grown in popularity and this application was viewed as an alternative method in the Malaysian higher education settings.

However, the effectiveness of ODL is important in order to ensure the process teaching and learning proceeds smoothly and would surely lead to improved student performance. According to Musa et al (2020) most organisations prioritize effectiveness in achieving their goals and objectives. The effectiveness of ODL depended on interaction of online distance learning, academic performances and information and communication technology (ICT) as well as technology support system (Musa et al., 2020). This is supported by Dzakiria et al (2013); Gunawardena & McIsaac (2013), where the concept of interaction is important to the effectiveness of the ODL program. At the same time, in order to ensure the effectiveness of ODL and appropriate usage of information and communication technology (ICT) based innovative learning platforms should be developed (Amin, 2018).

Hardware and software provision and effectiveness of open and distance learning (ODL)

The ODL's primary components are hardware and software. The effectiveness of ODL is dependent on the availability of hardware and software for the learning and teaching processes. According to Loo (2015), the availability of hardware and software in addition to having understanding and skills to use ODL technologies influences the effectiveness of ODL. The primary determinants in learning efficiency for ODL were the consistency and stability of technology, as well as easy access to appropriate hardware and software (Piccoli et al., 2001). Therefore, the following hypothesis is proposed:

H1: There is a significant positive impact between the hardware and software provision and effectiveness of ODL during COVID-19

Interaction and Effectiveness of Open and Distance Learning (ODL)

Interaction is connectivity or active participation with something or someone. Interaction is a fundamental element in ODL. According to Dzakiria (2012); Van Den Berg (2020) interaction during ODL was divided into three category which were interaction between other learners, educator, study material and the ODL institution. The interaction that occurs between the students and lecturers was intended to help improve the students' understanding of the course

material and contents. Interaction with material occurs when students, with the help of the lecturer, create new knowledge by connecting new information with prior knowledge (Van Den Berg, 2020). Dzakiria (2012) mentioned that involvement, reactions and feedback were

components for the ODL process to be effective. Dzakiria et al (2005) stated that the increased level of the interaction had positive impact towards the effectiveness of ODL. Therefore, the following hypothesis is proposed:
H2: There is a significant positive impact between the interaction and effectiveness of ODL during COVID-19.

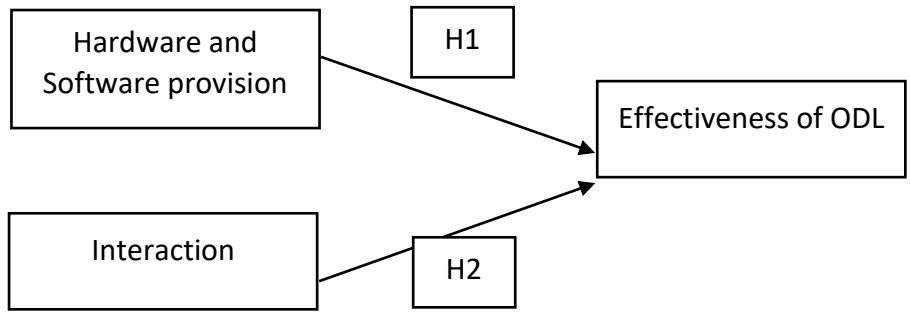

Figure 1: Conceptual Framework

Research Methodology
The study used quantitative approaches to data collection and analysis. The method of survey was conducted on the respondents. The respondents were full time students in undergraduate accounting course from Universiti Teknologi Mara (UiTM) located in Malaysia and the total population for this study was 11,694 students and the size of the sample was based on the Krejcie and Morgan table (1970) which was 375 students. Partial least squares regression (PLS regression) which WarpPLS version 7.0 was used to analyse the data. The survey was distributed through google form links to the respondents.
The questionnaires consisted of 34 items to measure independent and dependent variables. The dependent variable in this study is effectiveness of open and distance learning (ODL). The effectiveness of open and distance learning was measured based on the 7 items from previous study of Kaur et al (2020) which was related with the effectiveness of usability and expertise in computer, engagement of students in terms of time, and quality of teaching and learning.
The independent variable consisted of hardware and software, and interaction. Hardware and software provision was measured by 10 items adopted from (Bahasoan et al., 2020; Lee 2008). For interaction, the measure was adopted from Tsai et al (2020) and consisted of 17 items. These variables were categorised under three categories: learner-learner interaction, learner-tutor interaction and as well as learner-interface interaction. The responses of the survey participants for each of the items were measured on five-point Likert scale, ranging from 1 (“strongly disagree”) to 5 (“strongly agree”).

Results
The study had managed to obtain a response rate of 100%, fulfilling the required sample size of 375 accounting students. According to Sekaran (2003), preliminary steps were taken to ensure quality of the data prior to initiating any proper statistical data analysis. First, the analysis started by conducting the inspection of missing data. There were no missing data as the questionnaire were distributed in the Google Forms, thus all answer fields were set as mandatory and must be answered by the students before they were able to proceed with the next step of the questionnaire.
Secondly, the normality test was performed using the IBM SPSS version 27. In this study, although the Shapiro-Wilk test indicated that all variables were significant, thus is non-normal

data, but Tabachnick et al (2007) stated that the normality test is sensitive, and it frequently detects deviations from normality that are insignificant. Therefore, to ensure the data was approximately normal, the outliers were identified by using the boxplot and in order to correct the outliers the windsoring technique was used. Later, it was confirmed the data is approximately of normal distribution through the visual indicator of histogram and normal Q-Q plot.

Third, the construct reliability test was conducted using the Warp PLS version 7.0. Every item in the survey questionnaire went through the reliability analysis in accordance with the extracted three constructs. This suggests that the instruments for each construct are accurate, consistent and precise with the values of Cronbach's alpha and Composite reliability coefficients above 0.70. It can be concluded that the construct has a high reliability or is reliable. According to Hair (2010); Nunnally (1978); Urbach (2010) the Cronbach alpha values for the three construct were above 0.7 which was considered as acceptable. The results of analysis were presented in the table 1. Therefore, all the variables were relevant and reliable to use in this study.

Finally, using the Warp PLS to test the validity of the instrument, the 34 items in the questionnaire were measured based on factor loading. At the same time, the test validity of construct also can be known from the value of AVE. According to the Gorsuch (1974) a factor loading of higher than 0.40 was considered sufficient. The factor loading of lower than 0.40 should be eliminated (Krasnova et al., 2008). Based on the table 1 below, the factor loading for each item had values higher than 0.40. According to Fornell & Larcker (1981) even though the AVE values lower than 0.5, but if the values of composite reliability were higher than 0.6 then the construct is still adequate. It can be concluded that data used has already had good convergence validity.

Table 1
Reliability and validity of variables understudy

Construct	Number of items	Cronbach's Alpha	Factor loading	Composite Reliability	AVE
Hardware and software provision	10	0.865	0.579-0.749	0.892	0.452
Interaction	17	0.918	0.532-0.730	0.928	0.435
Effectiveness of open and distance learning (ODL)	7	0.847	0.632-0.795	0.884	0.524

Further analysis was conducted to test for the impact of hardware and software provision and interaction on the effectiveness of ODL during the COVID -19 using the Warp PLS version 4.0.

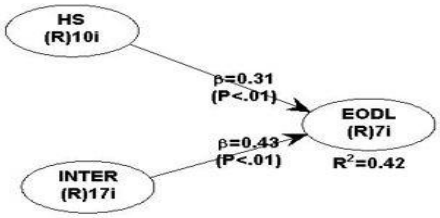

Figure 2: Path analysis

The values of R-Square represent the amount of variance explained by the independent variables. The values of path coefficient signify the strength of the relationship between the dependent and independent variables. Both the values of R-square and the path coefficient signify how well the data support the hypothesis model. Figure 2 show the value of R-square is 0.42, explaining that the above variables had 42% variance in the effectiveness of open and distance learning.

Hypothesis 1 explores the relationship between hardware and software provision and effectiveness of open and distance learning, which is the hardware and software provision has a significant positive impact on the effectiveness of open and distance learning. This hypothesis is supported ($\beta = 0.31$, $\rho < 0.01$).

Hypothesis 2 explores the relationship between interaction and effectiveness of open and distance learning, and it was proven and supported by the PLS result. It was proven that the interaction has a significant positive impact on the effectiveness of open and distance learning ($\beta = 0.43$, $\rho < 0.01$). Thus, both of hypotheses are supported by the PLS result.

Discussion and Conclusion

The findings of this study clearly indicate that the hardware and software provision and interaction have a significant positive impact on the effectiveness of ODL. This is consistent with the previously discussed literature while providing empirical evidence that these two variables influenced the effectiveness of ODL. This study would be of significance to higher education institutions, lecturers, students and researchers. At the same time, during the COVID-19 pandemic, the process of teaching and learning can be improved and lead to an efficient and effective ODL learning method. In line with the government policy, this study supports the education continuation strategies that was implemented by the Malaysian Ministry of Education (MoE). The MoE introduced four strategies to be implemented during COVID-19, which are (1) flexible class schedule and pedagogies, (2) synchronous and asynchronous online class, (3) collaboration with mass media, and (4) digital learning communities for professional development. Overall, the results of this study was able to achieve its objective with the best analytical and logical results.

However, there are the limitations where this study was only focused on the two variables, excluding other relevant variables like time management and type of assessments. Another limitation is this study only focuses on the specific geographic area and context of the study. Additionally, this study also did not further investigate relationships between the dependent and independent variables which meant it was focused only on the direct impact of each variable. Finally, this study only applied quantitative methods and used the online data collection method. Future studies can explore more deeply regarding the relationship

between these variables, focus on different variables, broaden the scope of the research and researchers are also encouraged to apply different methods.

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