

The Influence of Self-Directed Learning Readiness, Learning Motivation, and Digital Accessibility on Postgraduate Students' Engagement in Online Distance Learning

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Abstract: Online Distance Learning (ODL) has become an integral component of postgraduate education in Malaysian private universities, yet maintaining students' engagement remains a critical challenge. This study investigates the influence of Self-Directed Learning Readiness (SDLR), Learning Motivation, and Digital Accessibility on postgraduate students' engagement in ODL. A quantitative research design was employed using a structured questionnaire administered to 300 postgraduate students enrolled in private universities in Malaysia. Data will be analysed using Partial Least Squares Structural Equation Modelling (PLS-SEM) to examine the proposed relationships among the constructs. The study proposes three hypotheses: H1: Self-Directed Learning Readiness positively influences postgraduate students' engagement in ODL; H2: Learning Motivation positively influences postgraduate students' engagement in ODL; and H3: Digital Accessibility positively influences postgraduate students' engagement in ODL. The findings are expected to provide empirical evidence that supports the enhancement of student engagement and offer practical implications for higher education institutions in improving the effectiveness of online postgraduate learning.

Keywords: Online Distance Learning (ODL), postgraduate students, student engagement, self-directed learning readiness, learning motivation, digital accessibility, PLS-SEM, Malaysia

1. INTRODUCTION

In higher education institutions across the globe, Online Distance Learning (ODL) has emerged as a vital way of delivering education, especially with the rapid digital transformation that took place during and after the COVID-19 pandemic. While many universities have started offering in-person classes, ODL is still a vital part of postgraduate programs because of its flexibility, accessibility, and capability to serve working adults engaged in lifelong learning. With the proliferation of digital learning environments, teaching and learning have evolved from location- and time-bound models to ones in which learners can access and engage with educational content anywhere, anytime (Brown et al., 2024; Tawil & Miao, 2024).

Internet-based learning technologies have become an essential component in private higher education institutions (PHEIs) in Malaysia because flexible postgraduate education is in high demand. In the world of postgraduate education, Learning Management Systems (LMS), virtual classrooms, cloud-based coordinating systems, and digital learning resources are part and parcel of teaching and learning processes. The transition is in line with UNESCO's focus on the digital transformation as a means of ensuring equitable and inclusive access to higher education and providing lifelong learning opportunities (Tawil & Miao, 2024). Often, postgraduate students have other obligations, such as work and family, and it is a practical option for them to pursue advanced qualifications in ODL so that they can balance their work and family demands.



Although there are many benefits of using ODL, one of the biggest problems that has been encountered by higher education institutions is student engagement. Student engagement is a measure of a student's level of behaviour, emotion, and thinking during the learning process. Students who are engaged are actively involved in discussions, completing academic tasks, collaborating with peers, and putting their effort into learning outcomes. The benefits of high levels of student engagement have been consistently shown to positively influence academic outcomes, student satisfaction, retention, and programme completion (Brown et al., 2024; Deng & Yang, 2025). On the other hand, low engagement rates correlate with procrastination, low motivation, lower academic performance, and higher dropout rates.

The matter of engagement is especially important when teaching and learning take place in online environments where students and their teachers do not have a close physical relationship. While in the traditional classroom setting, learning activities are managed by the teacher, ODL gives students more autonomy in managing learning activities. Thus, technological infrastructure is not only necessary for successful online learning, but also personal characteristics and learners' learning behaviours. One study that has recently come to light is the need for the factors that contribute to engagement in an online learning environment, specifically for postgraduate students who have numerous competing responsibilities (Brown et al., 2024; Deng & Yang, 2025).

Self-Directed Learning Readiness (SDLR) has been consistently correlated with success in online learning. SDLR means an individual's readiness and eagerness to assume responsibility for planning, carrying out, monitoring, and evaluating his/her own learning activities. Knowles' theory of self-directed learning states that people who have good self-management skills can better identify their learning needs, formulate learning goals, choose learning strategies, and evaluate their learning results on their own. These qualities are especially significant in online learning, as the student must learn independently without any direct supervision. Results from Ahmed (2024) revealed that there is found to be positive correlation between self-directed learning readiness and online learning engagement; thus, the more prepared the learners in self-directed learning, the more they would engage in online learning activities.

Moreover, self-directed learning has become more prominent in the digital age as educational institutions stress the importance of preparing students to be lifelong learners who can adjust to the changing learning and work worlds. Self-directed learning skills are associated with better self-regulated learning and are important factors in enabling students to manage their learning schedules, seek help when needed, and persevere in learning despite any difficulties they may face in virtual learning environments (Ahmed, 2024). Hence, self-directed learning readiness is anticipated to be one of the factors that will have a significant contribution to the level of engagement in the learning process of postgraduates in ODL.

Learning motive is also one of the important factors affecting students' involvement. It is well established that motivation can have a significant impact on the onset, direction, persistence and intensity of learning behaviours. Motivation levels are generally high, encouraging pupils to engage with learning activities, to persevere through learning difficulties and to apply themselves throughout their learning. In a context of online learning, motivation is especially significant due to the possible perception of isolation, decreased social interactions, and limited immediate feedback from the teacher (Walker et al., 2024).

Learners who are motivated display better motivation in learning activities, better persistence in doing assignments, and more willingness toward learning materials. It has been found that motivational factors like self-efficacy, self-determination, achievement goals, and task value have a significant impact on motivation and learning processes of students in the online and blended learning context (Walker et al., 2024). Hence, the importance of studying the influence of learning motive on the engagement of postgraduate students still cannot be denied in creating online learning strategies.

While personal characteristics play a role in students' engagement in ODL, external factors like digital accessibility can also impact students' engagement. Digital accessibility is about the ability of students to access, use, and reap the benefits from digital technologies that are needed to support their learning, such as accessing the internet,

using digital devices, digital learning platforms, and online resources. For online learning to be effective, sufficient digital access is required to enable meaningful engagement with learning activities (Tawil & Miao, 2024).

While digital technologies have opened educational opportunities, there are still inequities in access to reliable internet services and suitable digital devices. These disparities can result in a lack of engagement among students, restrict access to learning resources, and pose difficulties for children in participating in learning activities. Digital inclusion and just access have been emphasized by UNESCO as key prerequisites of effective digital education systems for quality learning outcomes (Tawil & Miao, 2024). Hence, those postgraduate students who can access the internet more easily will be expected to engage in online learning more than those who do not.

The studies have dealt with each of the three issues of self-directed learning in ODL, motivation and digital accessibility separately, with no study so far focusing on the interaction of these factors among the postgraduate students in Malaysian private universities. In the context of the increasing trend of online learning within postgraduate education, it is important to have empirical evidence that can help to inform the identification of the key factors that can ensure good student engagement. These relationships can help higher education institutions create targeted interventions and support mechanisms to improve the quality and effectiveness of post-graduate online learning.

This study is therefore aimed at investigating the effect of Self-Directed Learning Readiness, Learning Motivation, and Digital Accessibility on post-graduate students' participation in Online Distance Learning in Malaysian private universities. Using Partial Least Squares Structural Equation Modelling (PLS-SEM), the study aims to present empirical evidence that can support the existing body of knowledge on online learning engagement and recommendations for educators, administrators, and policymakers.

2. LITERATURE REVIEW

2.1 Postgraduate Students' Engagement

Student engagement is a well-known factor in effective learning and academic outcomes in higher education. For Online Distance Learning (ODL), the term student engagement is used to describe the degree of active and positive behavioural, emotional, and cognitive engagement that students exhibit during an online learning experience. Redmond et al. (2018) define online engagement as interactions between students and course content, students and instructors, students and other students, and students and learning technologies. In online learning contexts, engagement is especially important because it is essential that students take responsibility for managing their own learning and for being actively engaged in their own learning.

The reasons for this are that having students engaged in the learning process is directly related to academic achievement, student satisfaction, retention and programme completion rates, which is why student engagement has become an area of interest and research following the widespread adoption of ODL. While online engagement continues to be a challenge for higher education institutions, students might feel isolated, less motivated, and have limited interpersonal interaction compared to the traditional classroom environment (Brown et al., 2024). In the same manner, Deng and Yang (2025) found that students who are engaged in learning will be more active in learning activities, have high learning achievements, and have positive attitudes toward learning online.

There are three approaches to the idea of engagement: behavioural engagement, emotional engagement, and cognitive engagement. Behavioural engagement involves students' active participation in learning activities, such as engaging in virtual classes, doing homework, and participating in discussions. Emotional engagement is a feeling of interest, satisfaction, belonging, and enthusiasm in learning experiences. Cognitive engagement refers to the mental activity students put in while processing, analysing, and applying their knowledge gained in the learning process (Deng & Yang, 2025).

In post-graduation studies, engagement takes on a new degree of significance as post-graduation students often have professional careers as well as family responsibilities while in school. Postgraduate students are expected to show a higher degree of autonomy, critical thinking, and independent learning as compared to their undergraduate

counterparts. So, retaining engagement during an online course becomes a critical component in achieving the desired learning objectives. Research indicates that postgraduate students who continue to be active are more likely to complete study, research activities, and programme satisfaction (Martin & Bolliger, 2018).

Digital technologies are becoming more prevalent in higher education, and this has led to opportunities and challenges for student engagement. The use of LMS, video conferencing, online discussion forums, and collaborative learning has made education more accessible and flexible. Yet, there are some technological barriers, such as limited internet connection, lack of digital literacy, and lack of interaction opportunities, which are likely to have a negative effect on engagement and participation for students. Thus, institutions should create strategies that address the academic, social, and emotional learning and development of students in virtual learning environments.

Various factors related to the learner and the environment are found to have influenced engagement in ODL: self-directed learning readiness, motivation, technological competence, technological accessibility, and teaching quality (Brown et al., 2024; Deng & Yang, 2025). These are all important factors to be understood, as increased engagement leads to better learning performance, knowledge acquisition, and student persistence. Thus, postgraduate student engagement is a dependent variable in this study, which measures student active participation and their efforts in learning online.

2.2 Self-Directed Learning Readiness (SDLR)

Self-Directed Learning Readiness (SDLR) is a person's readiness, capability, and eagerness to assume responsibility for his/her own learning processes. The idea is based on Knowles' (1975) self-directed learning theory, which states that the learner ought to produce a diagnosis of learning needs, set learning goals, select learning materials, create learning strategies, and assess learning results. In online learning, students must learn independently and under less direct supervision; SDLR has a crucial role in influencing learning effectiveness and learning engagement.

Self-directed learning is growing in significance for postgraduate students, given the accelerated growth of ODL. In ODL, students must manage their own learning schedules, control their study habits, and find their own way to get support when they encounter difficulties, as they do in the classroom format where the instructor is closely monitoring learning activities. Thus, students who have high SDLR can be expected to be more successful with online learning. Geng et al (2019) found that self-directed learners have better self-management ability, technology self-efficacy, and motivation.

Some of the dimensions of SDLR are self-management, self-control, self-discipline, learning initiative, and intrinsic desire for learning. Students with these attributes are likely to develop a habit of studying regularly and can actively participate in learning. However, in postgraduate education, where academic tasks are frequently independent research and critical inquiry, self-directed learning readiness plays an important role in academic success.

Empirical studies have been conducted recently and reported significant positive relationships between SDLR and online learning engagement. The findings of Ahmed (2024) showed that students with a high level of self-directed learning readiness showed significant differences in the use of online learning activities compared to students who had low readiness in self-directed learning. The findings of the study showed that self-directed learners participated in discussions more actively, completed academic tasks, and used online learning resources more actively. The results are consistent with those of Shen et al. (2013), who found that self-directed learners showed higher cognitive engagement and academic persistence in online courses.

Self-regulated learning theory is another factor contributing to the significance of SDLR, stating that if students can plan, monitor, and evaluate their learning performance well, they are more likely to get positive learning outcomes. Self-directed learners have better metacognitive skills, which help them to recognize situations of learning difficulty and take corrective action when they arise. Consequently, they can better maintain interest and deal with challenges of online learning.

In the digital world, institutions of learning are beginning to focus on equipping learners with abilities in self-directed learning. The training programs on time management, goal setting, learning strategies, and digital skills have been launched to improve the preparedness of the students for online learning environments. The development of SDLR benefits academic success but also builds the qualities of lifelong learning, which are crucial in today's knowledge-based societies.

Considering the autonomy of ODL, the postgraduate students are expected to be more active in carrying out online learning activities, especially in carrying out group activities and learning projects based on the readiness of their self-directed learning skills. Thus, SDLR is hypothesized to have a positive impact on the involvement of postgraduate students in ODL.

2.3 Learning Motivation

Learning motivation is a stimulus that can be internal and external in nature that encourages learners to start, drive, and maintain their learning behaviour to realize learning objectives. The importance of motivation in the determination of academic achievement, persistence, and engagement has been a longstanding concern. The importance of learning motivation is even greater in online learning because students may face problems such as decreased face-to-face interaction, isolation, and lack of supervision outside the classroom.

Self-Determination theory (Ryan & Deci, 2000) suggests that motivation could be classified as intrinsic or extrinsic. Intrinsic motivation involves doing activities to learn for the sake of self-satisfaction, curiosity, or interest; extrinsic motivation involves doing activities to learn for external benefits like grades, promotions, or qualifications. Motivation towards learning affects learners' behaviour, and it is found that intrinsically motivated students tend to show a higher level of involvement and commitment in the learning process in the long term.

In ODL settings, motivation is a key factor that supports students' engagement in learning tasks, completing assignments and overcoming obstacles. Students who are motivated are more likely to participate in online discussions, to regularly access digital learning materials and to undertake collaborative learning activities. Walker et al. (2024) state that motivation continues as one of the most studied factors related to success and interest in online learning. The meta-analysis identified the pivotal role motivational constructs, including self-efficacy, mastery goals, and task value, play in learning experiences in online settings.

Motivation is closely related to student engagement; its influence on student motivation is a determinant of the level of student involvement in educational activities. More motivated individuals tend to participate more actively in classes (behavioural engagement), have positive attitudes about learning (emotional engagement), and put in more mental effort in learning the content of the class (cognitive engagement). On the other hand, students who are not motivated can show signs of withdrawal, decreased involvement, and poor performance.

The complexity and intensity of postgraduate studies make it very significant that motivation is important for them. Several postgraduate learners are concurrently studying in higher education while managing work, money, and family commitments. Motivation is essential throughout an academic programme to be able to address the barriers and make good progress towards the educational objectives. Few studies have demonstrated that motivated postgraduate students are more likely to display greater resilience, commitment and persistence when completing their studies.

In recent years, there have also been references in the literature which indicate that students' motivation can be improved through supportive learning environments. Motivation is positively affected by instructor feedback, interactive learning activities and collaboration with peers, and academic support services. In addition, the use of technology like learner-friendly LMS platforms and interactive digital content can enhance learners' motivation and engagement.

For this reason, learning motivation is considered a pivotal factor for students' engagement in an online learning environment. Students who are motivated to learn are more likely to engage in activities related to learning, put effort

into learning tasks, and gain positive learning outcomes. Based on the above, this study offers a hypothesis that learning motivation has a positive effect on postgraduate students' participation in ODL.

2.4 Digital Accessibility

Digital accessibility is defined as accessibility, affordability, usability, and reliability of digital technologies to access and engage with online learning environments. For ODL, digital access also includes access to internet connectivity, digital devices, learning management systems, software applications, and online learning resources. Digital accessibility is an essential prerequisite for a successful learning experience, which is heavily dependent on technology-mediated interactions as a key part of ODL.

Digital transformation has paved the way for more access to education. Higher education has experienced a tremendous amount of transformation in the digital space, and this has increased access to education. But there are still challenges for many students regarding technology access. UNESCO (2024) pointed out that despite the progress made in digital access, this continues to be a key challenge in the pursuit of inclusive and equitable education, especially for learners with socioeconomic, geographical, and technological disadvantages. Access to digital resources is limited for students who sometimes struggle to access learning materials, communicate with their teacher, and participate in virtual classes.

Digital Accessibility is not just about having technological devices. It also incorporates the quality of internet connectivity, the availability of technical support, digital literacy skills, and access to online learning platforms. Tawil and Miao (2024) suggested that digital education would need to be integrated and have systems that could assist the learner with reliable connections, access to digital content, and inclusivity in technological infrastructures. Students could face disruptions that negatively impact learning continuity and engagement if digital accessibility is not in place.

There are some studies that have indicated significant relationships between digital accessibility and educational outcomes. There is a general tendency for learners with stable internet access and sufficient technical tools to be more active participants in online discussions, to access online content, and to be able to complete learning activities more efficiently online. On the other hand, poor connectivity and access to devices can lead to frustration, less engagement, and poor academic outcomes.

Digital accessibility is vital for postgraduate students as postgraduate programs often rely heavily on high-level digital tools for research, data analysis, collaboration, and academic communication. Students should be able to access technological resources regularly, which allows students to complete coursework and to conduct research. Digital accessibility is also a critical aspect of postgraduate learning due to the growing use of cloud-based learning systems, virtual libraries, video conferencing applications, and online databases.

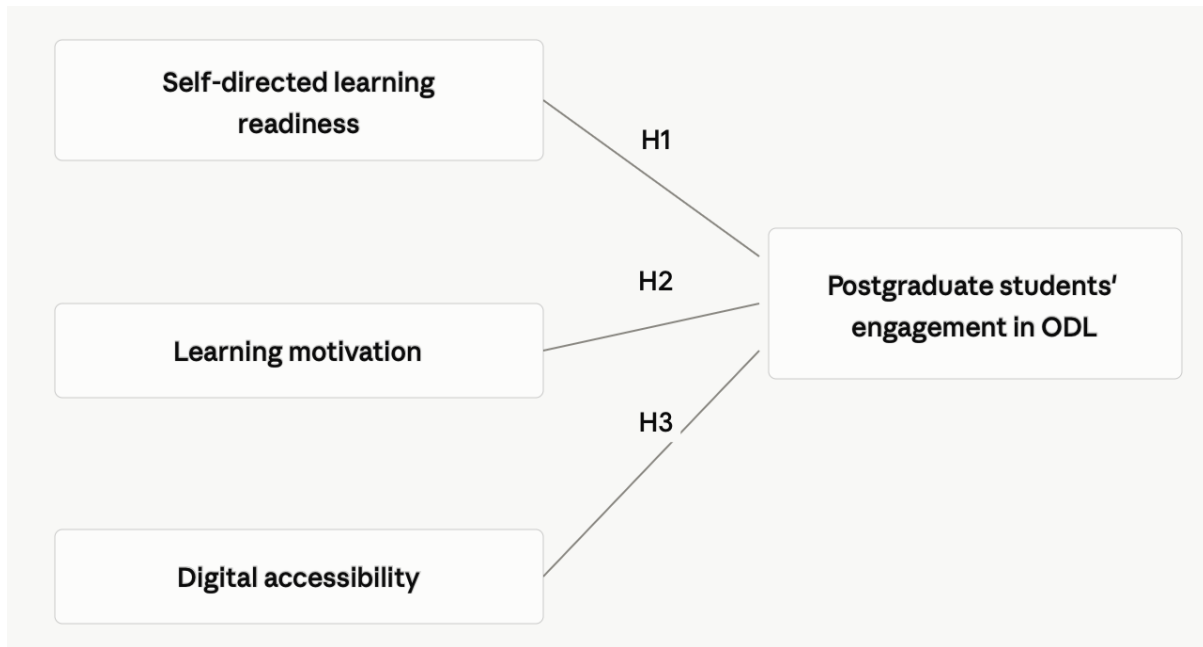
With respect to the Digital Divide Theory, unequal access to technology may lead to unequal opportunities and outcomes in education. Digital technology access is associated with better learning outcomes in online education for students, as opposed to those who have less access to digital technology. Thus, universities are required to put the investment into the development of digital infrastructure, learning platforms that are accessible, and support systems that provide equal participation for every learner.

Digital accessibility is an important player in student engagement as ODL becomes more commonplace in higher education. Learners who have adequate technology access can engage in consistent participation, interaction with the curriculum, and staying engaged in learning. The proposed vision for this study is that digital accessibility will have a positive effect on postgraduate students' participation in ODL.

3. RESEARCH METHODOLOGY

3.1 Research Framework

Figure 1: Framework



3.2 Research Hypothesis

H1: Self-Directed Learning Readiness positively influences postgraduate students' engagement in ODL

H2: Learning Motivation positively influences postgraduate students' engagement in ODL

H3: Digital Accessibility positively influences postgraduate students' engagement in ODL.

3.3 Instrument Research

Table 1: Questionnaire

Scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree

Variable	Code	Questionnaire Item	Source (Adapted/Adopted)
Self-Directed Learning Readiness (SDLR)	SDLR1	I can set my own learning goals in online courses.	Guglielmino (1977); Fisher et al. (2001)
	SDLR2	I can effectively manage my study schedule without supervision.	Guglielmino (1977); Fisher et al. (2001)
	SDLR3	I identify my learning needs before starting a learning task.	Fisher et al. (2001); Shen et al. (2013)
	SDLR4	I actively seek additional learning resources when needed.	Shen et al. (2013); Ahmed (2024)
	SDLR5	I evaluate my learning progress regularly during online courses.	Fisher et al. (2001); Shen et al. (2013)

Learning Motivation	SDLR6	I take responsibility for solving academic problems independently.	Guglielmino (1977); Ahmed (2024)
	SDLR7	I am confident in directing my own learning in an online environment.	Shen et al. (2013); Ahmed (2024)
	LM1	I am motivated to participate actively in online learning activities.	Pintrich et al. (1991); Walker et al. (2024)
	LM2	I put considerable effort into completing online learning tasks.	Pintrich et al. (1991)
	LM3	I am determined to achieve my academic goals through ODL.	Deci & Ryan (2000); Walker et al. (2024)
	LM4	I find learning through ODL personally rewarding.	Deci & Ryan (2000)
	LM5	I remain committed to learning even when online courses are challenging.	Keller (2010); Walker et al. (2024)
Digital Accessibility	LM6	I am interested in learning new knowledge through online courses.	Pintrich et al. (1991); Deci & Ryan (2000)
	LM7	I feel motivated to engage with course materials regularly.	Keller (2010); Walker et al. (2024)
	DA1	I have reliable internet access to participate in online classes.	UNESCO (2024); Van Dijk (2020)
	DA2	I have adequate digital devices (e.g., laptop, tablet, smartphone) for ODL.	Van Dijk (2020)
	DA3	I can easily access learning materials through online platforms.	Wei & Chou (2020)
	DA4	I rarely experience technical difficulties during online learning.	Tawil and Miao (2024)
	DA5	The online learning platforms used by my university are easily accessible.	UNESCO (2024); Wei & Chou (2020)
	DA6	I have sufficient digital skills to use online	Van Dijk (2020); UNESCO (2024)

		learning technologies effectively.	
	DA7	Technical support is available when I encounter problems during ODL.	Tawil and Miao (2024)
Postgraduate Students' Engagement in ODL	ENG1	I actively participate in online class discussions.	Dixson (2015); Redmond et al. (2018)
	ENG2	I regularly attend scheduled online learning sessions.	Dixson (2015)
	ENG3	I complete online learning activities and assignments on time.	Dixson (2015); Martin & Bolliger (2018)
	ENG4	I make a serious effort to understand course content in ODL.	Redmond et al. (2018)
	ENG5	I interact with lecturers when I need clarification.	Martin & Bolliger (2018)
	ENG6	I collaborate with classmates during online learning activities.	Redmond et al. (2018); Martin & Bolliger (2018)
	ENG7	I remain focused and engaged throughout online learning sessions.	Dixson (2015); Brown et al. (2024)

4. METHODOLOGY

This study will involve 300 post-graduates from private universities in Malaysia. The respondents will consist of master's and PhD students who have experience in Online Distance Learning (ODL). They should be from various types of people and have different ages, subject areas, and years of study. Selected respondents are found to be suitable as they are using digital learning platforms regularly and have first-hand experience of ODL environments. The answers they give will provide insight into the effect of SDLR, Learning Motivation, and DAR on student engagement in online learning among postgraduate students in Malaysia.

5. DISCUSSION AND FINDING

The assessment of the measurement model was conducted to evaluate the reliability and convergent validity of the study constructs before proceeding to structural model analysis. Reliability assesses the internal consistency of the measurement items, while convergent validity examines the extent to which indicators of a construct share a high proportion of variance. In PLS-SEM, Composite Reliability (CR) and Average Variance Extracted (AVE) are commonly used to evaluate these measurement properties. According to Hair et al. (2022), a CR value of 0.70 or higher indicates satisfactory reliability, whereas an AVE value exceeding 0.50 demonstrates adequate convergent validity. As presented in Table 2, all constructs achieved CR values above 0.90 and AVE values above 0.50, indicating that the measurement items are reliable and valid in measuring their respective constructs. Therefore, the measurement model meets the recommended criteria and is suitable for further hypothesis testing and structural model evaluation.

Table 2: Reliability and Validity

Construct	CR	AVE
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Self-Directed Learning Readiness	0.921	0.664
Learning Motivation	0.903	0.651
Digital Accessibility	0.917	0.689
Engagement in ODL	0.934	0.702

Table 2 presents the reliability and convergent validity assessment of the study constructs, namely Self-Directed Learning Readiness, Learning Motivation, Digital Accessibility, and Engagement in ODL. The results indicate that all constructs achieved Composite Reliability (CR) values above the recommended threshold of 0.70, ranging from 0.903 to 0.934. According to Hair et al. (2022), CR values exceeding 0.70 demonstrate satisfactory internal consistency reliability, indicating that the measurement items consistently represent their respective constructs.

Furthermore, the Average Variance Extracted (AVE) values range from 0.651 to 0.702, surpassing the minimum acceptable value of 0.50. This suggests adequate convergent validity, meaning that each construct explains more than 50% of the variance of its indicators (Fornell & Larcker, 1981). Among the constructs, Engagement in ODL recorded the highest CR (0.934) and AVE (0.702), indicating excellent reliability and validity. Overall, the findings confirm that the measurement model is reliable and valid for subsequent structural model analysis.

5.1 Hypothesis Testing

The structural model assessment was conducted to examine the hypothesised relationships between Self-Directed Learning Readiness, Learning Motivation, Digital Accessibility, and postgraduate students' engagement in Online Distance Learning (ODL). The significance of the proposed relationships was evaluated using path coefficients (β), t-values, and p-values generated through the bootstrapping procedure in SmartPLS. According to Hair et al. (2022), a hypothesis is considered statistically significant when the t-value exceeds 1.96, and the p-value is below 0.05. The path coefficient indicates the strength and direction of the relationship between the independent and dependent variables. Previous studies have consistently reported that self-directed learning readiness, learning motivation, and digital accessibility are important determinants of student engagement in online learning environments (Ahmed, 2024; Brown et al., 2024; Deng & Yang, 2025). As shown in Table 3, all hypothesised relationships are positive and statistically significant ($p < 0.001$), indicating support for H1, H2, and H3.

Table 3: Result Hypothesis

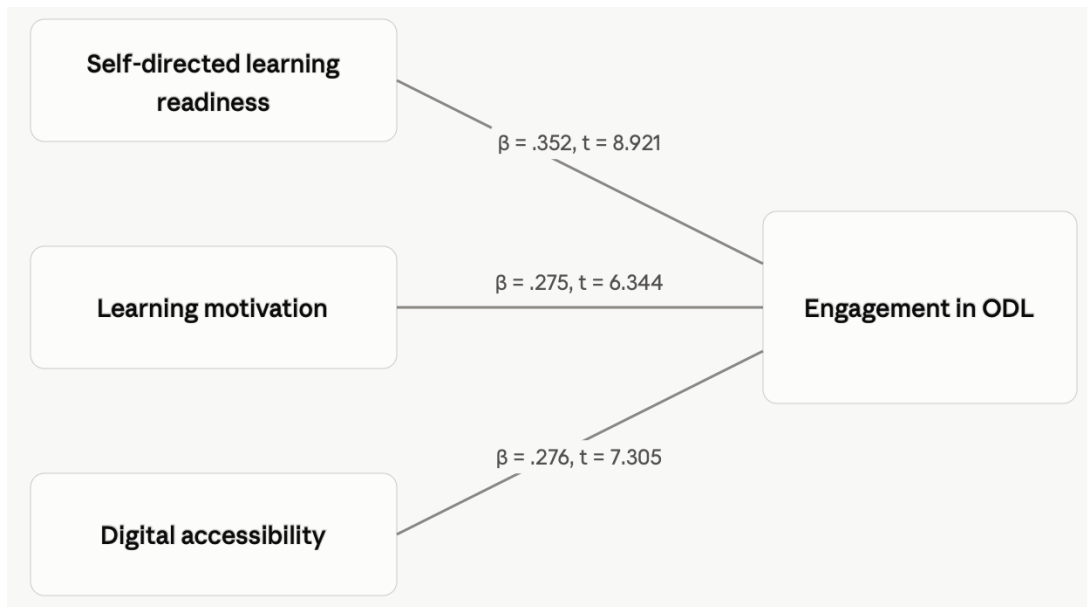
Hypothesis	Path	β Coefficient	t-value	p-value	Decision
H1	Self-Directed Learning Readiness → Engagement in ODL	0.352	8.921	< 0.001	Supported
H2	Learning Motivation → Engagement in ODL	0.275	6.344	< 0.001	Supported
H3	Digital Accessibility → Engagement in ODL	0.276	7.305	< 0.001	Supported

Table 3 presents the results of the structural model analysis. The findings indicate that Self-Directed Learning Readiness has a significant positive influence on postgraduate students' engagement in ODL ($\beta = 0.352$, $t = 8.921$, $p < 0.001$). This result supports H1 and suggests that students who are more capable of independently managing and directing their learning activities tend to demonstrate higher levels of engagement in online learning. The finding is consistent with Ahmed (2024), who found a significant positive relationship between self-directed learning readiness and online learning engagement. Similarly, Geng et al. (2019) reported that self-directed learners are more likely to participate actively in online learning and exhibit stronger commitment to academic activities.

The results also reveal that Learning Motivation positively influences engagement in ODL ($\beta = 0.275, t = 6.344, p < 0.001$), supporting H2. This finding indicates that highly motivated postgraduate students are more likely to engage actively in online learning activities, complete academic tasks, and persist despite challenges encountered during ODL. This result is aligned with Self-Determination Theory, which suggests that motivated learners demonstrate higher levels of participation and persistence in educational settings (Deci & Ryan, 2000). Furthermore, Walker et al. (2024) found that learning motivation plays a significant role in enhancing students' involvement and commitment in online and blended learning environments.

Finally, Digital Accessibility shows a significant positive effect on engagement in ODL ($\beta = 0.276, t = 7.305, p < 0.001$), thereby supporting H3. The finding suggests that easier access to internet connectivity, digital devices, and online learning platforms enhances students' ability to participate effectively in online learning activities. This result is consistent with the work of Tawil and Miao (2024), who emphasized that digital accessibility is a critical factor for successful participation in digital education. Likewise, Wei and Chou (2020) demonstrated that students with adequate technological access and digital readiness exhibit higher engagement and satisfaction in online learning environments.

Figure 2: Path Model



The findings confirm that Self-Directed Learning Readiness is the strongest predictor of engagement in ODL, followed by Digital Accessibility and Learning Motivation. These results highlight the importance of developing students' self-directed learning capabilities, strengthening learning motivation, and ensuring adequate digital access to enhance postgraduate students' engagement in Online Distance Learning.

5.2 Model Fit

The coefficient of determination (R^2) was assessed to evaluate the predictive power of the structural model. Accordingly, the results presented in Table 4 demonstrate the extent to which the independent variables collectively explain postgraduate students' engagement included in the model. In this study, Self-Directed Learning Readiness, Learning Motivation, and Digital Accessibility were examined as predictors of postgraduate students' engagement in Online Distance Learning (ODL). Higher R^2 values indicate a greater explanatory power of the model. Chin (1998) suggested that R^2 values of 0.19, 0.33, and 0.67 can be interpreted as weak, moderate, and substantial, respectively. The results presented in Table 4 demonstrate the extent to which the independent variables collectively explain postgraduate students' engagement in ODL.

Table 4: Model Construct

Endogenous Construct	R ²	Interpretation
Engagement in Online Distance Learning (ODL)	0.448	Moderate

Table 4 presents the coefficient of determination (R²) for the endogenous construct, namely Engagement in Online Distance Learning (ODL). The results indicate an R² value of 0.448, suggesting that 44.8% of the variance in postgraduate students' engagement in ODL is explained by Self-Directed Learning Readiness, Learning Motivation, and Digital Accessibility. Based on the guideline proposed by Chin (1998), the R² value can be interpreted as moderate, indicating that the model has satisfactory explanatory power.

This finding implies that the three independent variables play an important role in influencing students' engagement in online learning environments. Specifically, students who demonstrate higher self-directed learning readiness, stronger learning motivation, and better digital accessibility are more likely to engage actively in ODL activities. The remaining 55.2% of the variance may be explained by other factors not included in this study, such as instructor support, online learning satisfaction, self-efficacy, technological competence, and social interaction (Deng & Yang, 2025; Redmond et al., 2018). Overall, the model demonstrates an acceptable level of predictive capability and provides empirical support for understanding the determinants of postgraduate students' engagement in ODL.

6. FUTURE RESEARCH AND RECOMMENDATION

This study's results give useful insights into the factors affecting the involvement of postgraduate students in Online Distance Learning (ODL). Yet, there are several possibilities for future research. Second, further research should consider self-efficacy, instructor support, learning satisfaction, technological competence, and social interaction as additional variables that can be incorporated into the future study to give a comprehensive understanding of learners' engagement in an online learning environment (Deng & Yang, 2025; Redmond et al., 2018). Second, the study can be extended to include post-graduate students from other public and private universities, or to make comparisons across countries to increase the generalizability of the results. In addition, a mixed methods design with interviews or focus groups could give more in-depth information regarding the experiences and challenges faced by students in ODL.

Higher education institutions need to develop programmes to improve students' self-directed learning abilities, such as time management, goal setting, and self-regulation strategies based on the results of this study. Additionally, universities need to establish programs that incentivize learning by making the learning process more interesting and continuously supporting students' learning. Moreover, institutions are expected to provide a reliable digital infrastructure, accessible learning platforms, and technical support to enhance students' learning experiences. By engaging in these efforts, higher engagement, academic achievement, and effectiveness of postgraduate online learning can be achieved.

7. CONCLUSION

This study explored the effect of Self-Directed Learning Readiness, Learning Motivation, and Digital Accessibility on Malaysian postgraduate students' involvement in Online Distance Learning (ODL) in the Malaysian private universities. The results showed that all three factors had significant and positive effects on students' participation in ODL and thus supported all the hypotheses that were proposed. In terms of the predictors, Self-Directed Learning Readiness was found to be the strongest predictor of engagement, suggesting that learners who can manage, monitor, and direct their own learning tend to engage more in online learning activities. This is in line with past research that has emphasized the significance of learner autonomy in online learning (Ahmed, 2024; Geng et al., 2019).

The results also indicated that Learning Motivation significantly affects engagement in ODL, indicating that motivated students are more likely to be engaged and committed in pursuing academic goals and actively participating in learning within virtual classrooms (Deci & Ryan, 2000; Walker et al., 2024). Moreover, Digital Accessibility was

identified as a positive influence on engagement, highlighting the critical role of internet connectivity, digital devices, and online learning platforms in ensuring effective engagement with ODL (Tawil & Miao, 2024; Wei & Chou, 2020).

Furthermore, the model accounted for 44.8% of the variance in postgraduate students' engagement, which is a moderate percentage of variance explained. The study, in general, adds to the current knowledge base on Online Learning by offering empirical evidence of the significant factors that facilitate the engagement of postgraduate students in ODL. The results have implications for higher education institutions, teachers, and policy makers in the development of strategies that will boost self-directed learning, motivate students, and enhance digital access to facilitate the success and sustainability of online postgraduate education.

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