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A Conceptual Analysis on the Antecedents of Intention to Enroll Online Courses: The Integration of TAM and TPB

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Abstract
This paper aims to impart a conceptual analysis of the relationship between perceived usefulness, perceived ease of use, perceived behavioral control, and digital literacy with the intention to enroll online courses among undergraduate students in Malaysia. Additionally, the mediating effects of attitude on the relationship between the independent and dependent variables are also tested in this study. The proposed theoretical framework in this conceptual paper is guided by the integration of TAM and TPB. Theoretically, this study provides an integrative model that influence the intention to enroll online courses driven by the extension of TAM and TPB. This study extents the literature on online courses enrollment from the perspectives of developing countries, generally, and Malaysia, particularly through identifying the contextual factors and their effects on the intention to enroll online courses among undergraduate students. Finally, this study provides an empirical model that guides higher education institutions on understanding the factors that influence the undergraduate students' intention to enroll in the online courses.
Keywords: Perceived Usefulness, Perceived Ease of Use, Digital Literacy, Attitude, Behavior Intention, Online Courses, Undergraduate Students.

Introduction

Online learning has gained significant popularity in recent years, offering flexibility, accessibility, and affordability to learners worldwide. The COVID-19 pandemic further emphasized the importance of online education as educational institutions globally shifted to remote learning to ensure the safety of students and curb the spread of the virus. This sudden transition highlighted both the potential and challenges of online learning, making it crucial to examine its effectiveness and identify factors that influence learners' intention to enroll in online courses.

The importance of studying the effectiveness of online learning becomes evident when considering the scale of its adoption. In the United States alone, more than 6 million students enrolled in online courses in 2018, with this number projected to rise significantly in the future (NCES, 2020). Similarly, in Malaysia, higher education institutions were compelled to embrace online learning due to the movement control order (MCO) imposed during the pandemic,

affecting students across the country (Ebrahim, 2020; Quinn, 2020). It is worth noting that online education is not limited to developed countries but also holds immense potential for expanding educational opportunities in developing nations (Bozkurt & Sharma, 2020; Coman *et al*., 2020).

However, the effectiveness of online learning depends on various factors, and students face numerous challenges in this mode of education. Technical knowledge, time management skills, and familiarity with digital tools all influence the learning experience (Joosten & Cusatis, 2020). Additionally, students encounter obstacles such as network issues, limited access to shared resources, and reduced opportunities for interaction (Aboagye *et al*., 2020). Concerns regarding social isolation, delayed clarification of doubts, and inadequate infrastructure further complicate the online learning landscape (Abou *et al*., 2014; Yusuf & Banawi, 2013). Despite these challenges, online education offers unique advantages, including flexibility, easy content distribution, and interaction through chat platforms (Anwar & Adnan, 2020; Marinoni *et al*., 2020; Suresh *et al*., 2018).

In line with the United Nations' Sustainable Development Goals, which recognize education as a key component for global progress, online courses have the potential to foster inclusivity in education (Ray, 2020). However, to fully leverage the benefits of online learning, it is crucial to understand the factors that influence learners' intention to enroll in online courses. Educators and researchers need to identify critical elements that affect the acceptance of technology-based teaching and learning (Coman *et al*., 2020). In the context of e-learning, modifications to existing models such as the Technology Acceptance Model (TAM) are necessary to account for the connection between technology acceptance, perception, and actual learning outcomes (Alfadda & Mahdi, 2021). Developing a comprehensive understanding of these factors is essential, particularly in the context of developing countries like Malaysia, where research in this area remains scarce.

To bridge this gap, this study aims to provide a conceptual analysis of the antecedents of learners' intention to enroll in online courses. By integrating two well-established theoretical models, the TAM and the Theory of Planned Behavior (TPB), this research seeks to offer insights into the relationships between perceived usefulness, perceived ease of use, perceived behavioral control, digital literacy, and intention to enroll in online courses. The TAM, widely employed in the field of information systems, explains individuals' acceptance of technology based on perceived usefulness and perceived ease of use (Davis, 1989). In contrast, the TPB explores how attitudes, subjective norms, and perceived behavioral control influence individuals' intention to engage in specific behaviors (Ajzen, 1991). By integrating these models, this study aims to contribute to a comprehensive understanding of the factors that shape learners' intention to enroll in online courses through the investigation of the relationships between perceived usefulness, perceived ease of use, perceived behavioral control, digital literacy, and intention to enroll in online courses. In addition, this study intends to examine the mediating effect of attitude on the relationship between the independent and dependent variables.

Literature Review and Hypotheses Development

Underpinning Theories

Technology Acceptance Model (TAM)

The TAM proposed by Davis (1989) has been employed in various research studies, and therefore, it has become quite significant in the literature pertaining to technology acceptance (Chang *et al*., 2017). Besides, it has been concluded in a recent systematic review

that the application of TAM in educational technology acceptance has proved its effectiveness as compared with the other theoretical models (Qaysi *et al*., 2018). This theory has two core factors, namely perceived usefulness and perceived ease of use. TAM was extended from the theory of reasoned action (TRA), which noted that the behavior of an individual is determined by his or her behavioral intention whereas it is determined by subjective norms and attitude (Ajzen & Fishbein, 1977). According to TAM as shown in Figure 1, perceived usefulness and perceived ease of use are affected by external and system-specific factors to predict the attitude towards using a technology. The attitude itself affects the behavioral intention to use a particular technology, which in turn, predicts the actual system use.

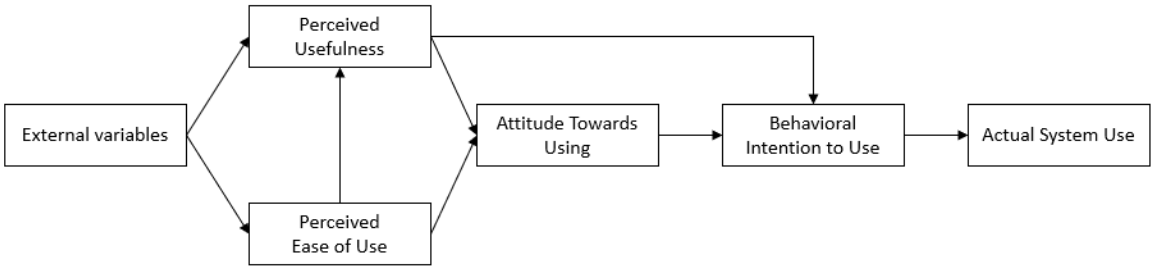

Figure 1: Technology acceptance model (TAM)

The TAM is a widely used theoretical framework that explains how users accept and adopt new technologies. TAM suggests that perceived ease of use and perceived usefulness are the two main factors that influence users' intention to adopt new technologies. Several studies have used TAM to investigate the factors that influence students' intention to enroll in online courses. A study by Huang *et al* (2021) investigated the factors that influence students' intention to enroll in online courses using TAM. The study found that perceived ease of use and perceived usefulness significantly influenced students' intention to enroll in online courses. The results also showed that perceived instructor support was a significant moderator between perceived ease of use and intention to enroll in online courses. Another study by Khan *et al* (2021) investigated the factors that influence students' intention to enroll in online courses using TAM. The study found that perceived ease of use and perceived usefulness significantly influenced students' intention to enroll in online courses. The results also showed that students' prior experience with online courses moderated the relationship between perceived ease of use and intention to enroll in online courses. Thus, the TAM is a useful theoretical framework for understanding students' intention to enroll in online courses. Perceived ease of use and perceived usefulness are the two main factors that influence students' intention to enroll in online courses.

Theory of Planned Behavior (TPB)

TPB underlying the effort of TRA has been proven successful in predicting and explaining human behavior across various information technologies (Ajzen, 1991, 2002). According to TPB, a person's actual behavior in performing certain action is directly influenced by his or her behavioral intention and in turn, jointly determined by attitude, subjective norm and perceived behavioral control toward performing the behavior. Behavioral intention is a measure of the strength of one's willingness to try and exert while performing certain behavior. Attitude explains the feeling of a person's favorable or unfavorable assessment regarding the behavior in question. Furthermore, a favorable or unfavorable attitude is a direct influence on the strength of behavior beliefs about the likely salient consequences.

Meanwhile, subjective norm expresses the perceived organizational or social pressure of a person while intending to perform the behavior in question. In other word, subjective norm is relative to normative beliefs about the expectations of other persons. Perceived behavioral control reflects a person's perception of ease or difficulty toward implementing the behavior in interest. It concerns the beliefs about presence of control factors that may facilitate or hinder to perform the behavior. In sum, grounded on the effort of TRA, TPB is proposed to eliminate the limitations of the original model in dealing with the behavior over which people have incomplete volitional control (Ajzen, 1991). In essence, TPB differs from TRA in its addition of the component of perceived behavior control. TPB model as shown in Figure 2 addresses attitude, subjective norm, and perceived behavioural control to offer accurate understanding of behaviour prediction. According to TPB, salient beliefs that are important to a behaviour are a result of that behaviour. These key convictions are viewed as the pervasive influences that shape a person's intention and behaviour.

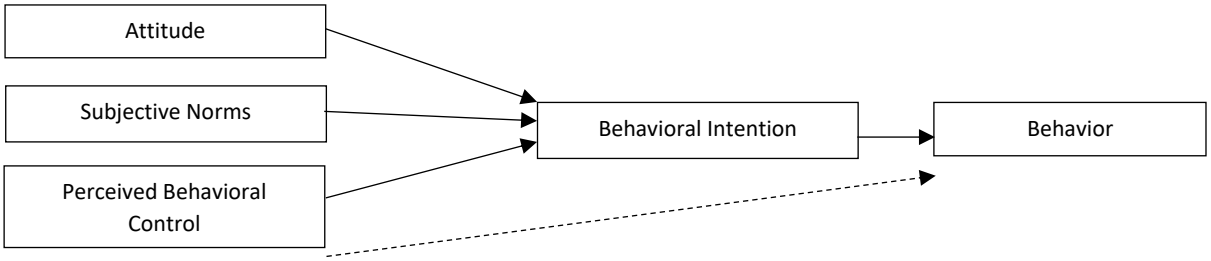

Figure 2: Theory of planned behavior model

The TPB is a widely used theoretical framework that explains human behavior and its intention. The TPB states that behavior is determined by a person's intention to engage in that behavior, which is, in turn, influenced by their attitude towards the behavior, subjective norms, and perceived behavioral control. Several studies have used the TPB to investigate the factors that influence students' intention to enroll in online courses. A study by Alqahtani and Rajpoot (2021) investigated the role of TPB in predicting students' intention to enroll in online courses. The study found that attitude towards online learning, subjective norms, and perceived behavioral control significantly predicted students' intention to enroll in online courses. The results also showed that perceived behavioral control was the most significant predictor of students' intention to enroll in online courses. Another study by Keshavarz and Zarei (2021) investigated the relationship between TPB and students' intention to enroll in Massive Open Online Courses (MOOCs). The study found that attitude towards MOOCs, subjective norms, and perceived behavioral control significantly predicted students' intention to enroll in MOOCs. Moreover, the results showed that the perceived behavioral control was the most significant predictor of students' intention to enroll in MOOCs. Thus, TPB is a useful theoretical framework for understanding students' intention to enroll in online courses.

Perceived Usefulness

Perceived usefulness refers to learners' perceptions of whether a particular system can improve their learning performance (Rogers, 1995). Online courses offer students the opportunity to learn at their own pace, which can benefit slower learners by allowing them to review confusing material until they master it and benefit faster learners by allowing them to move on when they have mastered the material (Hart *et al*., 2019). They also enable

immediate feedback on student performance through intelligent tutoring systems and offer a unique interactive experience between students and course materials (Means *et al*., 2014). Online courses provide students with access to high-quality teaching and coursework (Hart *et al*., 2019). The benefits of online courses include improvements in students' competencies, skills, and knowledge (Al-Rahmi, 2015). Perceived usefulness is a critical factor in influencing behavioral intention to use e-learning (Al-Ammary *et al*., 2014; Alharbi & Drew, 2014). Lee and Chen (2021) examined the impact of perceived usefulness on students' attitude towards online learning during the COVID-19 pandemic. The results of their study showed a significant positive relationship between perceived usefulness and students' attitude towards online learning. Budiyanto *et al* (2019) investigated the factors influencing students' intention to enrol in online courses using the Unified Theory of Acceptance and Use of Technology (UTAUT) model. Their findings showed that Perceived usefulness significantly influenced students' intention to enrol in online courses. Chen and Li (2020) examined the factors influencing college students' intention to enrol in MOOCs using the extended UTAUT model. Their results revealed that perceived usefulness was a significant predictor of students' intention to enrol in MOOCs. Based on the literature, it is proposed that

Hypothesis 1(a): The perceived usefulness has a significant positive relationship with the students' attitude.

Hypothesis 2(a): The perceived usefulness has a significant positive relationship with the students' intention to enrol online courses.

Perceived Ease of Use

According to Rogers (1995), perceived ease of use refers to the learners' perception of a system's ease or effortlessness to use. In the context of this study, this term pertains to the students' viewpoints on how using the system can improve their learning experiences and academic performance. Other scholars have defined this term as the level of effort required to use a particular system (Preece, 2000; Venkatesh & Davis, 2000). The study of Lin *et al* (2021) examines the effects of online learning systems on students' perceived ease of use, attitude, and intention to use. The findings suggest that students' perceived ease of use is positively related to their attitude toward the online learning system, which, in turn, is positively related to their intention to use it. In addition, Seo and Lee (2020) investigate the relationship between online learning system usability and students' attitudes and intentions to use. The results show that perceived ease of use is positively related to both attitude and intention to use the system. The authors suggest that improving system usability may lead to more positive attitudes and intentions among students. Similarly, the study of Huang and Wang (2019) examines the effects of perceived ease of use and perceived usefulness on intention to use e-learning among college students in marine engineering. The findings suggest that perceived ease of use has a significant positive effect on intention to use e-learning. The authors recommend that e-learning systems should prioritize ease of use in order to encourage more widespread adoption. These studies support the hypotheses that perceived ease of use is positively related to both attitude and intention to use online learning systems. Therefore, it is proposed that

Hypothesis 1b (H1b): *The perceived ease of use has a significant positive relationship with the students' attitude.*

Hypothesis 2b (H2b): *The perceived ease of use has a significant positive relationship with the students' intention to enrol online courses.*

Perceived Behavioral Control

Perceived behavioral control is a key construct in the TPB that refers to an individual's perception of their ability to perform a particular behavior (Ajzen, 1991). It reflects the extent to which a person feels they have the necessary resources and skills to carry out the behavior (Ajzen, 2002). Perceived behavioral control is influenced by factors such as past experience, knowledge, and environmental constraints (Ajzen, 1991). For example, in a study examining students' intention to use online learning, perceived behavioral control was found to be positively related to their intention, with students who perceived greater control more likely to intend to use online learning (Venkatesh & Bala, 2008). In the context of technology adoption, perceived behavioral control may include factors such as the ease of use of the technology, availability of technical support, and familiarity with the technology (Venkatesh *et al*., 2003). In a study on factors influencing the adoption of mobile payment, perceived behavioral control was found to be a significant predictor of intention to adopt, with individuals who felt more in control of their ability to use mobile payment more likely to adopt it (Zhou & Lu, 2011). Chen and Teng (2020) found that perceived behavioral control had a significant positive relationship with students' attitudes towards using a learning management system. In addition, the study of Al-Rahmi and Alias (2021) founds that perceived behavioral control had a significant positive relationship with students' intentions to enroll in online courses during the COVID-19 pandemic. According to Zhu *et al* (2021), perceived behavioral control had a significant positive relationship with students' intention to use mobile learning. Based on the aforementioned literature, it is proposed that:

Hypothesis 1c (H1c): *The perceived behavioral control has a significant positive relationship with the students' attitude.*

Hypothesis 2c (H2c): *The perceived behavioral control has a significant positive relationship with the students' intention to enrol online courses.*

Digital Literacy

Digital literacy has become increasingly important in today's world, as technology continues to advance and impact various aspects of our lives, including education. In recent years, there has been a growing interest in examining the relationship between digital literacy and students' attitudes and intentions towards enrolling in online courses. One study conducted by Chen and Hwang (2021) found that digital literacy had a positive relationship with students' intention to enroll in online courses. The study surveyed 420 undergraduate students and found that those with higher levels of digital literacy were more likely to express a positive attitude towards online learning and were more likely to enroll in online courses. The study also found that digital literacy had a significant impact on students' perceived ease of use and perceived usefulness of online courses, which in turn influenced their attitudes and intentions towards online learning. Similarly, a study by Liang and Huang (2021) examined the impact of digital literacy on students' attitudes towards online learning. The study surveyed 251 undergraduate students and found that those with higher levels of digital literacy had more positive attitudes towards online learning, including greater perceived benefits and fewer perceived barriers. The study also found that digital literacy had a direct positive effect on

students' willingness to enroll in online courses. Another study by Wu et al (2020) examined the impact of digital literacy on students' academic performance in online courses. The study surveyed 222 undergraduate students and found that those with higher levels of digital literacy performed better academically in online courses, including higher grades and greater satisfaction with the course. The study also found that digital literacy had a positive impact on students' motivation to learn and their engagement with online course materials. These studies suggest that digital literacy is an important factor in determining students' attitudes and intentions towards online learning. Students with higher levels of digital literacy are more likely to express positive attitudes towards online learning, perceive online courses as more useful and easier to use, and are more likely to enroll in online courses. Additionally, digital literacy has been found to have a positive impact on students' academic performance and engagement in online courses. Therefore, it is proposed that

Hypothesis 1d (H1d): *The digital literacy has a significant positive relationship with the students' attitude.*

Hypothesis 2d (H2d): *The digital literacy has a significant positive relationship with the students' intention to enrol online courses.*

Attitude

Attitude is a key factor that influences students' intention to enroll in online courses. The literature provides ample evidence to support the hypothesis that attitude has a significant positive relationship with the students' intention to enroll in online courses. For instance, a study by Ali *et al* (2020) found that students' attitude towards online learning was a significant predictor of their intention to enroll in online courses. The study also found that students who had a positive attitude towards online learning were more likely to enroll in online courses than those who had a negative attitude. Similarly, a study by Alqahtani and Rajpoot (2021) investigated the factors that influence students' intention to enroll in online courses using the TPB. The study found that attitude towards online learning was a significant predictor of students' intention to enroll in online courses. Another study by DeSantis and Ugianskis (2020) investigated the factors that influence students' intention to enroll in online courses using the TAM. The study found that attitude towards using technology for learning was a significant predictor of students' intention to enroll in online courses. Moreover, a study by Huang *et al* (2021) investigated the factors that influence students' intention to enroll in online courses using the TAM. The study found that perceived usefulness and perceived ease of use had a significant positive relationship with students' intention to enroll in online courses, and these factors were influenced by students' attitude towards online learning. Based on the literature, it is proposed that:

Hypothesis 3 (H3): *The attitude has a significant positive relationship with the students' intention to enrol online courses.*

Mediating Effect of Attitude

A study by Huang *et al* (2021) found that attitude partially mediated the relationship between perceived usefulness and students' intention to enroll in online courses, indicating that students' positive attitude towards online learning played a role in their decision to enroll in online courses. Similarly, a study by Khan *et al* (2021) found that attitude fully mediated the

relationship between perceived ease of use and students' intention to enroll in online courses. The study suggested that students' positive attitude towards using technology for learning was crucial in their decision to enroll in online courses. A study by Alqahtani and Rajpoot (2021) investigated the role of attitude in predicting students' intention to enroll in online courses. The study found that attitude towards online learning significantly predicted students' intention to enroll in online courses, suggesting that attitude played a mediating role between other factors and intention. In addition, a study by DeSantis and Ugianskis (2020) investigated the role of digital literacy in predicting students' intention to enroll in online courses. The study found that attitude partially mediated the relationship between digital literacy and students' intention to enroll in online courses, suggesting that students' positive attitude towards technology use was important in their decision to enroll in online courses. Based on the literature, it is proposed that:

Hypothesis 4a (H4a): *Attitude mediates the relationship between perceived usefulness and students' intention to enrol online courses.*

Hypothesis 4b (H4b): *Attitude mediates the relationship between perceived ease of use and students' intention to enrol online courses.*

Hypothesis 4c (H4c): *Attitude mediates the relationship between perceived behavioral control and students' intention to enrol online courses.*

Hypothesis 4d (H4d): *Attitude mediates the relationship between digital literacy and students' intention to enrol online courses.*

Intention to Enroll Online Courses

According to Ajzen (1991), the behavior intention refers to an individual's motivation and the effort made to accomplish a behavior, which determines whether or not the behavior will be performed. The behavior intention is considered the primary predictor of behavior, and when an appropriate measure of intention is available, it provides the most accurate prediction of behavior (Ajzen & Fishbein, 1980). Later, Perloff (2003) defined behavior intention as the intention to undertake a specific behavior and a plan to carry out the behavior. Scholars have frequently relied on behavior intentions rather than measures of actual behavior, as intentions are the most accurate predictor of people's actual behavior. Moreover, behavior intentions, behavior, and actions are all classified as "conative" (Ray, 1973). Therefore, it is reasonable to refer to behavioral intentions rather than behavior in the present study. In this study, the behavioral intention is the intention to enroll in online courses among undergraduate students in Malaysia. The behavioral intention of this study will be measured on five predictors: perceived usefulness, perceived ease of use, perceived behavioral control, digital literacy, and attitude. These predictors have been identified as crucial factors influencing an individual's intention to perform a behavior, according to the TPB (Ajzen, 1991) and the TAM (Davis, 1989). The perceived usefulness refers to the degree to which an individual believes that using online courses will be beneficial, while the perceived ease of use refers to the degree to which an individual believes that using online courses will be effortless. Perceived behavioral control refers to the individual's perception of the ease or difficulty of performing the behavior, while digital literacy refers to an individual's ability to use digital

technologies. Finally, attitude refers to an individual's overall evaluation of using online courses.

Theoretical Framework

The framework of this study presents its newness by integrating the TAM and TPB in designing the research framework, which highlights the relationship between perceived usefulness, perceived ease of use, perceived behavioral control, digital literacy, and intention to enroll in online courses, as well as the mediating effect of attitude on the relationship between the independent and dependent variables, as shown in Figure 3. There are no previous studies have been conducted using this framework, particularly in the Malaysia context. Therefore, the present study aims to fill this gap and serve as a bridge for future research in this area.

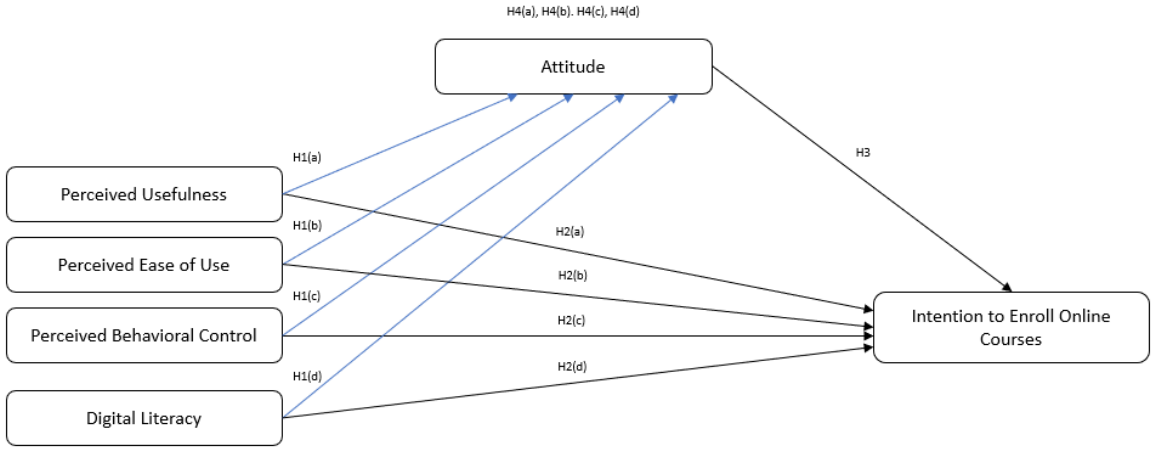

Figure 3: Proposed theoretical framework

Research Implications

The integration of TAM and TPB to investigate the antecedents of intention to enroll in online courses has several research implications. The findings can be used to improve online course design, enhance technology adoption, inform marketing strategies, and guide policy decisions related to online education. The findings of the study can help online course designers and educators to improve the design of online courses by identifying factors that influence students' intention to enroll in online courses. In terms of enhancing technology adoption, the findings of this study can provide insights into how educators and institutions can enhance technology adoption in online education. By understanding the factors that affect students' intention to enroll in online courses, educators and institutions can design interventions that encourage the adoption of technology in education. In addition, this study can inform marketing strategies for online education providers by identifying factors that influence students' intention to enroll in online courses. Providers can use the findings to create targeted marketing campaigns that emphasize the benefits of online education and address concerns that may prevent students from enrolling. On top of that, this study can provide insights into policy decisions related to online education. By identifying factors that influence students' intention to enroll in online courses, policymakers can design interventions that encourage the adoption of online education at the institutional or national level.

Conclusion

This study provides a conceptual analysis on the antecedents of intention to enroll in online courses by integrating the TAM and the TPB. The study identifies five crucial factors, namely perceived usefulness, perceived ease of use, perceived behavioral control, digital literacy, and attitude, that influence an individual's intention to enroll in online courses. The findings of this study provide insights for educators and policymakers to develop effective strategies to encourage the adoption of online courses among undergraduate students in Malaysia. The integration of TAM and TPB provides a comprehensive framework that can be applied to future studies on the adoption of online courses in different contexts.

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