Creating a positive behavior intention using an online learning platform technology: the mediating role of perceived online learning enjoyment

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Abstract

Purpose – Since there is lack of studies in determine factors that affecting enjoyment sentiment when using online learning system, this study aims to explore the antecedents of perceived online learning enjoyment by using extended technology acceptance model (TAM) and its effect on behavioral intentions (BIN) among higher education institutions students.

Design/methodology/approach – The research framework was empirically evaluated using a cross-sectional research design and the data was collected from 715 undergraduate students from public higher education institutions in Malaysia using an online survey method. A structural equation modeling using partial least square method was used to examine the hypothesized model.

Findings – The results of partial least squares structural equation modeling indicated that the main predictive variables of TAM along with the extended variables were significantly influence the perceived online learning enjoyment. Meanwhile, the analysis also identified that perceived online learning enjoyment can significantly generate positive BIN for using online learning platforms as well as it also plays as a significant mediator role.

Practical implications – This study has significant implications for higher education institutions that wish to develop online learning environment for their students by providing answers to higher education institutions on how to successfully use the learning management system to assist students’ learning performance from the aspect of online learning enjoyment sentiment.

Originality/value – This study is remarkable because it is the first attempt to explore the effect of these five predictors on students’ learning enjoyment toward online learning platforms and subsequently on BIN to use this learning platforms, especially in the context of Malaysian higher education system. It is also unique in the way to extend the use of TAM predictive variables with others variables to produce more informative results about the study. Hence, this study also has a new contribution in the literature in the domain of digital learning.

Keywords Distance education, Online learning, Sustainability learning, Human–computer interaction, Learning strategies

Paper type Research paper

1. Introduction

Information and communication technology currently has a huge impact on almost every aspect of modern life, affecting every industry from entertainment to business, education, and telecommunications. The internet has contributed significantly to introducing new interactions that are now emerging as important and effective tools for training, teaching and learning in many institutions around the world. A learning management system (LMS) is an online platform used by higher education institutions (HEIs) to manage instructional materials, assignments, correspondence and course instructions such as online learning (Kabassi et al., 2016). Specifically, the fundamental of online learning is using technology to disseminate information to targeted users, which makes a more flexible, creative and student-centered approach to the teaching and learning process (Tajik and Vahedi, 2021). Basically, in
the Web 2.0 era or even in the industrial revolution 4.0 (IR 4.0), tools are available to enable instructors and students to interact during the online learning process. This situation increases teacher–student interactions which influence student learning outcomes while incorporating learning activities such as social closeness, communication, instructor presence, assistance and curriculum development (Al-Azawei et al., 2017).

Several HEIs have implemented online learning methodologies as a result of technological advancement for various benefits. These benefits include giving flexibility and convenience to all students, better use of space especially classroom space and the achievement of students can be high compared to those through traditional classes (Siron et al., 2020).

Focusing on the Malaysian context, the Malaysian Ministry of Higher Education has clearly stated the need to develop courses that emphasize the value of online learning programs in all aspects of the higher education system. Due to this, online learning services were used by HEIs in Malaysia for the first time in the 2000s to begin to meet the growing demands of a very large number of students, regardless of time or geographical location (Asirvatham et al., 2005). However, the advancement of online learning services among Malaysian HEIs is not significant due to a lack of both the required infrastructures and quality control (Md Noh et al., 2012). Dramatic changes occur to the LMS among Malaysian HEIs after the sudden impact of the COVID-19 pandemic, where Malaysia had the most COVID-19 infections in Southeast Asia with 428 cases as of March 15, 2020 (Kamaludin et al., 2020) and forced the government to shut-down all HEIs in Malaysia to prevent the infection of new cases. Therefore, following the suggestion of UNESCO, all HEIs need to have a sophisticated online LMS that highlights the role of students in learning activities (Crawford et al., 2020; Nguyen, 2022).

While analyzing the prior literature, scholars around the world have explored the students’ behavioral intention (BIN) to use online learning specifically before and during the COVID-19 lockdowns (Dang and Zhang, 2021; Aji et al., 2020; Siron et al., 2020), but limited study was conducted on students’ BIN to use online learning platform after the slowdown of the COVID-19 infections. It is because in the Malaysian context, majority of HEIs students enjoy using this technology during the COVID-19 lockdowns (Subramaniam et al., 2022). However, no study was conducted about the influence of enjoyment of using this platform on their BIN after the slowdown of COVID-19 infections, especially in Malaysia. Additionally, limited study was conducted to explore the crucial factors that influence the perceived enjoyment online learning (POLE) of HEIs students (Nguyen, 2022; Dang and Zhang, 2021; Cheng, 2012). Thus, it can be considered that this is an important issue to gain additional insights into students’ perceptions about this LMS in order to guarantee the success of online learning approaches. Therefore, this situation will lead to the loophole of what motivates to enjoy online learning courses and how this perceived enjoyment sentiment will lead to positive BIN of using online learning in the future. Hence, to fill this loophole, this study addresses the following questions:

RQ1. What are the crucial factors that influence perceived online learning enjoyment among the HEI students?

RQ2. What is the effect of perceived online learning enjoyment on BIN using online learning?

Although several recent articles and discussions offer some insights into how students view online learning, there are still big discrepancies in the extent to which HEIs students around the world enjoy online learning platforms. According to the literature reviewed, there are various inconsistent indicators that have been used to gauge POLE. For example, by using a technology acceptance model (TAM), Cheng (2012) indicated that encouragement from the institutions, the versatility of the system and the accessibility of the services all help students enjoy online learning, while in Nguyen’s (2022) study, only perceived ease of use (PEOU) and
perceived usefulness (PUSE) were significantly influence the enjoyment sentiment among the students. A study conducted by Dang and Zhang (2021) with a similar study to Cheng (2012) also indicated that the content of the online learning courses is one of the significant factors that influence the POLE. Additionally, studies that use TAM to investigate the crucial factors of POLE have inconsistent results due to variations in demographic behaviors (Alrousan et al., 2022). In light of the TAM’s theoretical underpinnings and earlier research findings, additional research must be done to create a comprehensive model that combines validated and consolidated components and offers the best explanation for POLE and also to get a clear view of how POLE can influence BIN using online learning among the HEIs students. It is anticipated that the research findings will help in building an efficient online learning program in the present as well as in the future. All lecturers, tertiary educators, educational administrators, and especially HEIs students in Malaysia and other nations may find these findings useful.

2. Literature review

2.1 The technology acceptance model (TAM)

Notably, the theory of reasoned action (TRA; Fishbein and Ajzen, 1975) is one of the leading theories for evaluating human behavior and has been extended to the TAM (Davis, 1989). This model can also be used to determine an individual’s BIN but rather with regard to the adoption of new technologies. This theory has frequently been used as the foundation for the prediction framework for the deployment of online learning systems (Chu and Chen, 2016). According to Bag et al. (2022), the TAM model can explain students’ confidence in utilizing technology that enhances their learning outcome. This model also suggests that a student’s propensity to adopt the latest technology in online learning system can be measured by their enthusiasm for a particular system, which in turn depends on their opinion of the PUSE and PEOU.

Regardless to this dominant findings, TAM also has gradually grown and expanded by taking into account other than these two factors because these two factors are not the only ones that influence use intention (Sukendro et al., 2020). Many researchers extended the TAM by asserting that user traits, organizational issues and technological development processes might all affect how people perceive various technologies (Szajna, 1996). Hence, extended TAM has been applied especially in the context of education setting such as analyzing the behavior of library users and the intended use of electronic books (Mustafa et al., 2021), the investigation of factors influencing innovative online learning strategies (Yao et al., 2022), and a study of the influence on student’s intention to use the LMSs (Al-Mamary, 2022).

Specifically, when online learning technology improves, the issue of adopting this technology has been shifted to the perceived enjoyment of using this technology from the viewpoints of the learners (Cheng, 2012). This complex situation of user enjoyment can be important in determining the success of e-learning (Dang and Zhang, 2021). This is because the more fun they feel using the e-learning platform, the likelihood of getting a high adoption intention is high (Nguyen, 2022; Dang and Zhang, 2021). Therefore, this study considers three new constructs such as perceived self-efficacy (PSE), content richness (CRI) and instructor characteristics to extend TAM when analyzing the perceived online learning enjoyment in the online learning environment as to deepen our comprehension of students’ behaviors toward online education. Figure 1 shows the proposed research model for this study.

2.2 Hypothesis development and research framework

2.2.1 The positive effect of perceived ease of use (PEOU) and perceived usefulness (PUSE) toward perceived online learning enjoyment (POLE). PEOU and PUSE are two important predictive factors, as stated in the TAM model (Davis, 1989). PEOU can be defined as the
degree to which a person thinks utilizing a certain system would be effortless, whereas PUSE is the extent to which a person believes that employing a particular system would improve his or her performance (Davis, 1989). In this study, PEOU refers to how easy students believe in using an online learning platform and PUSE relates to what students believe about the benefits that they might get from using online learning platform. Since these two predictive factors are linked to the POLE, Cheng (2012) showed that POLE is the level of students’ enjoyment when using online platforms to accomplish their educational tasks, Dang and Zhang (2021) and Nguyen (2022) indicated that students will have more fun if online learning systems are easier to use and benefit them a lot. In view of the aforementioned literature, we believe that the easier it is for students to use the online learning platform and many benefits they get by using this technology, the more fun they will have during the learning process. Therefore, the following hypotheses are presented:

H1. PEOU positively affects perceived online learning enjoyment.

H2. PUSE positively affects perceived online learning enjoyment.

2.2.2 The positive effect of perceived self-efficacy (PSE) toward perceived online learning enjoyment (POLE). The idea of self-efficacy has been observed to be applied in numerous contexts and disciplines. According to Bandura (1977), self-efficacy is “a person’s own judgement in considering to realize the potential to successfully organize essential events to
fulfill the objectives given.” Thus, self-efficacy has the ability to influence people’s preferences for a particular area and their behavior. In addition, self-efficacy related to a person’s belief in what he can do with his skills in a certain situation as well as the variety of skills he has. Holden and Rada (2011) stated that high self-efficacy makes people confident to use technology. Therefore, in this study self-efficacy refers to students’ perceptions of their capability to use online learning platform effectively. Many researchers claim that self-efficacy is a major contributor to PEOU although not many studies have been done to theoretically explain how self-efficacy affects the enjoyment of online learning directly (Al-Azawei et al., 2017; Law et al., 2019; Siron et al., 2020). In our opinion, self-efficacy might be one of the factors of interest that can affect POLE because the students’ enjoyment in e-learning classes will increase when they are able to use online class functions correctly and properly. Hence, we postulate that:

**H3.** PSE positively affects perceived online learning enjoyment.

2.2.3 The positive effect of content richness (CRI) toward perceived online learning enjoyment (POLE). According to Daft et al. (1987), the ability of a particular medium to foster common knowledge and meaning is referred to as media richness, and it is mostly used to characterize and evaluate the success of communication channels within a group. They also categorized media richness into two which are information timeliness and CRI. Information timeliness is the ability to receive immediate feedback, while the ability to transfer many types of information is referred to CRI. However, in the online learning context, Cheng (2020) and Chen et al. (2022) indicated that the richness of content offered online is more appealing to students. This situation allows students to access a lot of information and a variety of media genres, such as text, images, voice-overs and videos, through internet and social media. Hence, it is a good way to enhance the online learning experience by distributing the learning content through various media. As mentioned by Loureiro et al. (2020) and Faisal et al. (2020), the learning process for students is impacted by media diversity, especially the level of enjoyment and BIN. As a result, students using this platform will be able to access a variety of learning materials, which improves their knowledge and allows them to access and exchange information quickly. Therefore, we believe that when the online learning content is at its best, the likelihood of students’ enjoyment will increase in using this platform. Hence, the following hypothesis is presented:

**H4.** CRI positively affects perceived online learning enjoyment.

2.2.4 The positive effect of instructor characteristic (INC) toward perceived online learning enjoyment (POLE). According to Ukut and Krairit (2019), in order to increase students’ acceptance of online learning experiences, instructors must have a high level of understanding and motivation about online learning technology. In addition, when it comes to the use of this technology, instructors should have behaviors like promptness to response a question, technological expertise, self-assurance and innovation to motivate students to learn in an online environment (Gunesekera et al., 2019). Instructor quality (INS) is the most important success factor for students to adopt online learning (Cheng, 2012; Alhabeeb and Rowley, 2017). This is also supported by Alqahtani and Rajkhan (2020) where the biggest barriers to online learning adoption in HEIs are the technical proficiency of instructors and computer literacy. Based on the empirical results from previous studies, we believe that when instructors have good characteristic in handling online learning technology, the students’ enjoyment in online learning classes will increase. Therefore, it is projected that:

**H5.** Instructor characteristic positively affects perceived online learning enjoyment.

2.2.5 The positive effect of perceived online learning enjoyment (POLE) toward behavioral intention to using online learning (BIN). The definition of perceived enjoyment is “the degree to which the action of utilizing a particular system is regarded to be personally enjoyable in
and of itself independent of the instrumental benefit of the particular type of system" (Cheng, 2012). For instance, statistics have shown that perceived enjoyment has a substantial impact on customers’ intentions to use these mobile internet applications (Park et al., 2014) and online payments (Rouibah et al., 2016). Online learning platform can be considered as a new and innovative technology that is thought to offer users some enjoyment while using it. In the context of online learning, it refers to the extent to which students like to engage in their learning activities using online platforms (Dang and Zhang, 2021). Guo et al. (2016) indicated that the students’ intention to learn online is strongly influenced by enjoyment they feel. A strong sense of enjoyment from online learning can influence positive behavior toward it, which can help learners use learning strategies effectively (Teo and Noyes, 2011). Based on these findings, it is reasonable to conclude that if students find online learning enjoyable, their degree of intention to use with it will be high. Hence, the following hypothesis is proposed:

\[ H6. \text{ Perceived online learning enjoyment positively affects BIN to using online learning.} \]

3. Research methodology

3.1 Instrument development

To explore our research model, we used a two-part questionnaire survey. Demographic information of the respondents was gathered in the first part, and the study model constructs were measured in the second part. The items were developed using the theoretical underpinnings of the TAM and previous studies related to the study. In addition, some modifications are made to the subject of e-learning. Specifically, the items on the PEOU, PUSE and POLE constructs were adapted from Nguyen (2022), whereas INS and PSE constructs were adapted from Alrousan et al. (2022). As for the CRI construct, five items were adapted from Daft et al. (1987) and the BIN construct was adapted from Venkatesh et al. (2003). Respondents’ responses to each item were measured using a seven-point Likert-type scale, with a range of 1 (strongly disagree) to 7 (strongly agree). A pretest is conducted to ensure the face validity of the construct before it is actually used. The questionnaire’s clarity, understandability and face validity were evaluated by five academic staff with PhDs in education and computer sciences. Then, the modified questionnaire was tested by 60 undergraduate students. Each construct showed high reliability, exceeding the desired Cronbach’s alpha (CA) reliability value of 0.7 (George and Mallery, 2010). Therefore, this modified form of the questionnaire was used for the actual data collection process.

3.2 Sampling and data collection

During the COVID-19 pandemic, every undergraduate student has been exposed to online learning due to the closure of the university physical operations. Therefore, the unit of analysis for this study is undergraduate students who have enrolled in public HEIs in Malaysia. With the support and cooperation of university lecturers, the convenience sampling approach was used to distribute the Google Form survey link. We set the following criteria to remove invalid questionnaires to ensure sample data quality: (1) response time was too fast (less than 60 s); and (2) respondents lack relevant experience with e-learning. G-Power analysis was used to determine the minimum sample size for this study, which was computed using 95% statistical power, a predicted effect size of 5%, and 10 predictor variables (including control variables), the study required a minimum of 262 samples.

A total of 841 students completed the survey willingly after approximately two months of data collection from November 1, 2022, to December 29, 2022. A final dataset of 715 valid responses was produced after the data cleaning process, which involved removing 126 responses that were identified as outliers, since they provided straight-lining answers to all
questions and some of them answer the questionnaire less than 60 s. As suggested by Kim et al. (2019), this type of answers can reduce the quality of data; it will mislead the overall conclusion about the analysis findings. Then, this dataset is used for further process of data analysis. Referring to Table 1, majority of students are female (59.6%) respondents. First year (45.3%) students are the majority of the respondents, more than the last year’s percentage (15.9%), while second year (38.5%) students have average participation in this study. Regarding the use of devices and networks, majority of the students use tablets (51.3%), followed by laptops (22%), smartphones (14.5%) and computers (12.2%) devices to participate in e-learning classroom. Meanwhile, almost half of the students have used mobile internet (66.9%) to participate in online learning classes.

3.3 Analysis procedure
Structural equation modeling (SEM) was chosen because it allows the researcher to address numerous related hypotheses in a single and systematic way by modeling the interactions between various independent and dependent factors simultaneously (Hair et al., 2017). Basically, there are two common SEM techniques that frequently used by the researchers: covariance-based SEM (CB-SEM) and partial least squares SEM (PLS-SEM). Due to the differences in the estimation process and results between the two approaches, it is essential to choose the best approach for the type of investigation. According to Hair et al. (2011, 2017), if the research is exploratory in nature, PLS-SEM should be used; however, if the goal is to verify the theory, CB-SEM should be used. Since this study will explore the existing theory by extending it with other constructs, PLS-SEM was used. In addition, PLS-SEM has the advantages of being free from the assumption of normality and performing better with small sample sizes as well as large sample sizes (Hair et al., 2017).

4. Results
4.1 Common-method bias (CMB)
In order to examine whether there is instrument bias, CMB is evaluated in this study since this study uses a survey approach by using two common techniques. First, we performed Harman’s single-factor test and the result of the first unrotated factor variance is 28.7%. Second, we also performed the analysis of variance inflation factor (VIF) between the constructs and the results showed that the VIF ranged from 1.004 to 1.552 (Table 2). Based on these two analyses, we can conclude that there is no CMB issue because the first unrotated factor variance is less than 50% (MacKenzie and Podsakoff, 2012) and the VIF value is less than 3.30 (Kock, 2015).

4.2 Measurement model
When reviewing the measurement model, convergent and discriminant validity were tested. In terms of convergent validity, all estimated factor loadings met the loading threshold of 0.7 and were statistically significant. For average variance explained (AVE), composite reliability (CR) and CA, the suggested cut-off values are 0.50, 0.70 and 0.70, respectively. According to Table 1, all constructs have CR and CA values greater than 0.70 and an AVE value larger than 0.50. Therefore, the results of factor loadings, AVE, CR and CA demonstrate adequate convergent validity (Hair et al., 2017). Further, diagonal elements of Table 3 display the square roots of the AVEs, which are higher than their correlations with any other constructs, indicating that the discriminant validity complies with the standards (Fornell and Larcker, 1981). Additionally, we used the heterotrait–monotrait (HTMT) ratio to measure the discriminant validity where all values were below 0.85, showing adequate discriminant validity (Henseler et al., 2015).
4.3 Structural model

Six hypotheses were statistically investigated in this study where all hypotheses were supported because the $p$-value was less than 5% level of significant (Hair et al., 2017), and it was supported by the 95% bootstrap confidence interval of BCa, where the zero value was not included in the confidence interval. These six constructs explained 54.9% of the POLE variance, whereas at the same time, POLE can explain 22.8% of the variance of online

<table>
<thead>
<tr>
<th>Variable</th>
<th>Indicator</th>
<th>Loading</th>
<th>$t$-value</th>
<th>AVE</th>
<th>CR</th>
<th>CA</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEOU</td>
<td>I can access the online learning platforms easily</td>
<td>0.944</td>
<td>15.006**</td>
<td>0.835</td>
<td>0.938</td>
<td>0.904</td>
</tr>
<tr>
<td></td>
<td>The online learning platform is easy to use</td>
<td>0.897</td>
<td>10.237**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>The online learning platform provides relevant functions for the course</td>
<td>0.899</td>
<td>10.870**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PUSE</td>
<td>Online contents are consistently linked to course outline</td>
<td>0.885</td>
<td>12.883**</td>
<td>0.778</td>
<td>0.913</td>
<td>0.858</td>
</tr>
<tr>
<td></td>
<td>Online course materials is valuable</td>
<td>0.918</td>
<td>13.966**</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>The assessments of the online class are related to the learning objectives</td>
<td>0.841</td>
<td>9.184**</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>PSE</td>
<td>I feel confident using the online learning platform</td>
<td>0.893</td>
<td>55.454**</td>
<td>0.804</td>
<td>0.925</td>
<td>0.879</td>
</tr>
<tr>
<td></td>
<td>I have the necessary skills for using the online learning platform</td>
<td>0.903</td>
<td>56.492**</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>I feel confident operating online learning platform functions</td>
<td>0.894</td>
<td>64.643**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CRI</td>
<td>The information provided in online class are relatively rich</td>
<td>0.789</td>
<td>29.162**</td>
<td>0.639</td>
<td>0.898</td>
<td>0.859</td>
</tr>
<tr>
<td></td>
<td>The information provided in online class is comprehensive</td>
<td>0.795</td>
<td>24.663**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>The information provided in online class is reliable and worthy of trust</td>
<td>0.819</td>
<td>30.414**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>The information provided in online class is helpful to me</td>
<td>0.801</td>
<td>28.991**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>The amount information provided in online class is sufficiently meet my information needs</td>
<td>0.792</td>
<td>31.823**</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>INS</td>
<td>The instructor provides high-quality instructions</td>
<td>0.743</td>
<td>19.897**</td>
<td>0.609</td>
<td>0.886</td>
<td>0.838</td>
</tr>
<tr>
<td></td>
<td>The instructor provides information on learning progress</td>
<td>0.793</td>
<td>25.261**</td>
<td></td>
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<tr>
<td></td>
<td>The instructor delivers instructions clearly</td>
<td>0.726</td>
<td>19.779**</td>
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<tr>
<td></td>
<td>The instructor’s measurement of student performance is fair</td>
<td>0.776</td>
<td>21.864**</td>
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<tr>
<td></td>
<td>The instructor motivates me to use the online learning platform</td>
<td>0.857</td>
<td>36.989**</td>
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<tr>
<td>POLE</td>
<td>I feel that my experience with online learning is enjoyable</td>
<td>0.845</td>
<td>39.716**</td>
<td>0.700</td>
<td>0.875</td>
<td>0.784</td>
</tr>
<tr>
<td></td>
<td>I feel that my experience with online learning is interesting</td>
<td>0.878</td>
<td>49.125**</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>I feel that my experience with online learning is pleasant</td>
<td>0.785</td>
<td>24.825**</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>BIN</td>
<td>I prefer the online learning platform to traditional learning</td>
<td>0.924</td>
<td>72.746**</td>
<td>0.838</td>
<td>0.939</td>
<td>0.903</td>
</tr>
<tr>
<td></td>
<td>The online learning platform is a smart process that I prefer to pursue</td>
<td>0.915</td>
<td>52.401**</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>I intend to use the online learning platform as the only learning tool in the future</td>
<td>0.906</td>
<td>38.969**</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1. Results of convergent validity

Note(s): AVE = average variance explained; CR = composite reliability; CA = Cronbach’s alpha; ** $p < 0.01$
Source(s): Table created by authors
learning BIN. This shows that the data are a good fit to the respective model (SRMR = 0.046). This is also supported by the result of the SRMR value, where the value is less than 0.08 as suggested by Henseler et al. (2015). In addition, all the control variables in this study were found to have no effect to the POLE and BIN endogenous constructs. Figure 2 shows the detailed results and statistical scores of the PLS-SEM.

### 4.4 Mediating analysis

Since the structural model analysis suggests that there is a possible mediating effect of the POLE toward the relationship between predictor variables and BIN, we further the analysis by performing the indirect test using the concept of bootstrapping as suggested by Hair et al. (2017). According to Hair et al. (2017), the mediation effect can be considered statistically exist if the indirect effect of 95% bootstrapping confidence interval do not include zero as well as the t-statistic was also above 1.96 (p < 0.05). Referring to Table 4, the results indicated that POLE statistically mediated the relationship of PEOU → BIN, PUSE → BIN, PSE → BIN, CRI → BIN and INS → BIN simultaneously since the indirect path of the mediation relationship were statistically significant.

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Path</th>
<th>VIF</th>
<th>PC</th>
<th>t-statistic</th>
<th>p-value</th>
<th>95% BCa bootstrap CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1</td>
<td>PEOU → POLE</td>
<td>1.006</td>
<td>0.107</td>
<td>2.637**</td>
<td>&lt;0.01</td>
<td>(0.023, 0.177)</td>
</tr>
<tr>
<td>H2</td>
<td>PUSE → POLE</td>
<td>1.023</td>
<td>0.115</td>
<td>2.639**</td>
<td>&lt;0.01</td>
<td>(0.029, 0.197)</td>
</tr>
<tr>
<td>H3</td>
<td>PSE → POLE</td>
<td>1.312</td>
<td>0.423</td>
<td>8.741**</td>
<td>&lt;0.01</td>
<td>(0.325, 0.515)</td>
</tr>
<tr>
<td>H4</td>
<td>CRI → POLE</td>
<td>1.417</td>
<td>0.153</td>
<td>2.673**</td>
<td>&lt;0.01</td>
<td>(0.039, 0.262)</td>
</tr>
<tr>
<td>H5</td>
<td>INS → POLE</td>
<td>1.552</td>
<td>0.302</td>
<td>5.706**</td>
<td>&lt;0.01</td>
<td>(0.190, 0.400)</td>
</tr>
<tr>
<td>H6</td>
<td>POLE → BIN</td>
<td>1.107</td>
<td>0.447</td>
<td>7.055**</td>
<td>&lt;0.01</td>
<td>(0.313, 0.560)</td>
</tr>
<tr>
<td>Control</td>
<td>GEN → BIN</td>
<td>1.113</td>
<td>0.060</td>
<td>0.785 (NS)</td>
<td>0.433</td>
<td>(-0.071, 0.174)</td>
</tr>
<tr>
<td></td>
<td>YOS → BIN</td>
<td>1.004</td>
<td>0.080</td>
<td>1.180 (NS)</td>
<td>0.238</td>
<td>(-0.054, 0.215)</td>
</tr>
<tr>
<td></td>
<td>DUS → BIN</td>
<td>1.020</td>
<td>-0.013</td>
<td>0.260 (NS)</td>
<td>0.795</td>
<td>(-0.111, 0.082)</td>
</tr>
<tr>
<td></td>
<td>NUS → BIN</td>
<td>1.011</td>
<td>0.021</td>
<td>0.330 (NS)</td>
<td>0.742</td>
<td>(-0.100, 0.142)</td>
</tr>
</tbody>
</table>

**Note(s):** SRMR = 0.046; PEOU = perceived ease of use; PUSE = perceived usefulness; PSE = perceived self-efficacy; CRI = content richness; INS = instructor quality; POLE = perceived online learning enjoyment; BIN = behavioral Intention; GEN = gender; YOS = year of study; DUS = devise use; NUS = network use; PC = path coefficient; BCa = bias corrected; CI = confidence interval; NS = not significant; *the bootstrap samples was 5,000 samples; **p < 0.05; ***p < 0.01

**Source(s):** Table created by authors
5. Discussion
This study investigates the factors that influence the perceived online learning enjoyment among students in Malaysian HEIs by using TAM and its extended factors. The results of the
study revealed the positive and significant role of PEOU and PUSE toward enjoyment of students in online learning, as Cheng (2012), Dang and Zhang (2021) and Nguyen (2022) conclude. It is indicated that students are more likely to use internet-based learning resources if they feel online learning platform is easy to use and benefit their academic performance. Alternatively said, these two external factors contribute to students’ excitement in using online learning. With regard to these findings, it is important to highlight the simplicity and efficiency of online learning because these factors help motivate students to use this learning platform and automatically allow them to use online learning systems more often as a result.

As for the effect of PSE toward students' enjoyment, the results of the study show a positive and significant effect relationship. This finding indicates that students’ involvement in courses will increase if they feel more confident using online learning platform. Thus, through this platform, their enjoyment of studying will gradually grow as they gain confidence during the learning process (Holden and Rada, 2011; Law et al., 2019; Siron et al., 2020). Besides that, the result also suggests that students’ perceptions of self-efficacy in using this learning platform can play a big role in fostering high involvement in using this learning platform as an important and valuable part of their learning progress. Hence, it implies that self-efficacy is a useful antecedent for predicting students’ perceived enjoyment in online learning.

The results also demonstrate that instructors’ characteristics significantly influence the enjoyment of students in using online learning platform, which is consistent with previous research (Gunesekera et al., 2019; Alqahtani and Rajkhan, 2020). The findings of the study show that the characteristics of the instructors play an important role in encouraging interaction among students with this learning system. In order to create this environment, the competence of instructors in online learning and handling various tools that help this learning is crucial to foster enjoyment among students. Besides that, students will use this platform and feel that it is useful if the instructors make the use of online learning easy and support them in doing so. Then, it is easy for students to comprehend the nature of learning and adapt to the technology part of the online learning system due to the high level of expertise of the instructors. In addition, the main goal of the instructors’ characteristics in online learning is to develop new approaches in making learning easier and convenient while producing good academic performance when using this platform.

In accordance with previous studies (Faisal et al., 2020; Loureiro et al., 2020; Cheng, 2020; Chen et al., 2022), this study also indicates that CRI has a significant positive affect on students’ learning enjoyment through online learning platform. The finding shows that the use of text, visuals, voice-overs and videos is the key atmosphere to help students feel happy during the learning process. This will happen because the core idea behind online learning is to exploit the immense amount of information regarding the specific content by disseminating it in a more systematic way. By doing so, this platform will allow students to learn the content in a more enjoyable way, which will differentiate it from traditional learning method. Therefore, it shows that CRI in the online learning platform can make it easier for students to increase their interest and have a clear effect on the learning itself more happily. Additionally, students can improve their professional knowledge with the help of enriched learning materials in online learning platform.

Moving on to the impact of students’ perceived enjoyment of online learning on their BIN to use online learning platform, the finding shows that the relationship is positively significant and it is consistent with previous study (Teo and Noyes, 2011; Cheng, 2012; Guo et al., 2016; Dang and Zhang, 2021). This implies that students will positively view online learning platform as more valuable and effective as long as they feel that using it is enjoyable. Therefore, in order to encourage more students to enroll in online learning, it is important to foster the idea that using online learning platform is informative and entertaining. As a result, HEIs should encourage students to enroll in higher level online courses as well as credential programs. Additionally, it is crucial for educational institutions that provide online
instruction to create course prospectuses and build modules that are simple for students to understand and make their learning process more cheerful and meaningful.

While performing the analysis, a notable and important finding emerged, which pertains to the mediation effect of perceived online learning enjoyment on the association between predictor factors and students’ BIN to use online learning platforms. The mediation effect identified in this study highlights a crucial element in the complex interaction of factors that influence the enjoyment of learners and their intentions about the use of online learning platforms. In other words, it means that achieving a high degree of BIN to use an online learning platform is closely linked to all predictor factors being in line with fostering students’ enjoyable experiences throughout their interactions with the online learning environment.

Three predictor variables that have been identified as having a substantial impact in this context are PSE, INS, and CRI. These elements work together to influence students’ emotional enjoyment, which in turn influences how they see the value and practicality of the online learning environment. The results indicate that PSE highlights the significant importance of students’ confidence in their ability to effectively navigate and succeed in the online learning environment. The qualities of instructors, including good communication, attentiveness and pedagogical approaches, play a significant role in influencing students’ enjoyment experiences. Simultaneously, the richness of content accessible on these platforms assumes a crucial function in attracting and maintaining students’ interest and motivation, consequently enhancing their sense of enjoyment.

Although our work has made considerable progress in enhancing comprehension in this field, it is crucial to recognize the relatively restricted extent of research on these associations within the wider context. The scholarly investigations carried out by Dang and Zhang (2021), Siron et al. (2020), Alqahtani and Rajkhan (2020) and Faisal et al. (2020) have provided evidence that various factors, including PEOU, PUSE, PSE, CRI and instructor characteristics, have the potential to enhance students’ positive enjoyment experiences within the realm of online learning. Therefore, the impact of these intensified enjoyment encounters on students’ determination to continue using online learning platforms is notable, as demonstrated by the research conducted by Cheng (2012), Dang and Zhang (2021) and Nguyen (2022).

Thus, the outcomes of this study stress the importance of perceived online learning enjoyment in the setting of online education as there was no direct impact of predictor variables on BIN in this study. These findings emphasize the need for more and comprehensive investigation of these complex interactions in future research initiatives. These initiatives have the potential to offer detailed insights on improving the efficacy and satisfaction of online learning platforms for students and can serve as a valuable resource for educational institutions seeking to optimize their online learning environments.

6. Implications for the study
6.1 Theoretical contributions
This study introduces new variables in TAM to expand its application by demonstrating how students enjoy using online learning platform and further explores the relationship between perceived enjoyment and the students’ BIN in response to the after-effects of the COVID-19 outbreak. Hence, we believe our study provides a comprehensive framework on the sentiment of online learning platform enjoyment that contains important information to help HEIs transform their paradigm. Thus, this study contributes to the literature in the context of online learning. Second, our study closes the geographical gap by offering a unique point of view on factors that make students enjoy using this platform, particularly from the perspectives of South East Asian students, who differ from other nations in several ways, such as culture, learning preferences, the physical environment and internet literacy. Third,
our research demonstrates that HEIs are required to grasp students’ need for enjoyment when they enroll in online courses by offering them an interactive online learning platform that combines the service quality from the perspectives of content, instructor and administrative assistance. Thus, students will exhibit positive behavior to learn from online learning, by having fun learning. Finally, this study provides a substantial theoretical addition by revealing the mediating role of perceived online learning enjoyment in the association between predictor factors and students’ BIN to utilize online learning platforms. The significance of emotional enjoyment in the context of online education is emphasized by this discovery, indicating that the relationship between predictor variables and students’ intents is not exclusively direct but also influenced by their enjoyment experiences. The innovative contribution enhances theoretical frameworks within the discipline, providing a more comprehensive comprehension of the complex dynamics between cognitive and enjoyment elements in online educational environments.

6.2 Practical contributions
In order to make learning easily accessible to students, majority of HEIs have switched to online learning platform. Since we have implemented this method especially during the COVID-19 outbreak, it is important to see how much students enjoy it and whether they plan to use this platform in the future based on this sentiment of enjoyment. Based on the findings, it is clear that students’ enjoyment has a significant direct effect on BIN due to the large $R^2$ value. It shows that students are more likely to use this platform if they enjoy using it which allows them to improve their necessary skills and knowledge. Thus, HEIs need to create a suitable online learning environment based on students’ requirements and enjoyment of online learning to ensure they use this platform in the future. In addition, our framework found that PSE is the most dominant factor influencing students’ enjoyment. Therefore, HEIs need to ensure that students’ confidence in their ability to use online learning platform is high. In order to have it, HEIs should take steps by thinking of ways to increase motivation among students to use this platform. For example, HEIs can do various campaigns on how to use online learning through platforms that are easily accessible to students such as social media platforms.

Additionally, this study also identified that important role of online learning instructors as well as online learning content to boost-up the students’ enjoyment of using this platform. This finding will provide HEIs a useful road map, which will impact teaching effectiveness and students’ academic success. Therefore, HEIs need to continuously evaluate course materials and instructors’ performance and conduct a comprehensive audit of LMS performance. Similarly, HEIs can also organize workshops for instructors so that they can develop quality content for online learning platform. Besides that, they also can be trained to become professional instructors who can control various learning situations on online learning platform. By doing this, it helps preserve the professionalism of learning and teaching from the aspect of teacher–student and student–student interactions.

Besides that, online learning is a flexible platform and has been shown to be the only efficient way to continue teaching throughout the global pandemic crisis. Hence, HEIs should make significant investment in this sort of LMS. To do this, the framework for developing an online learning platform must be the HEIs’ primary focus as it will guarantee the “usefulness” and “ease of use” of this LMS. Therefore, it is important to inspire students a sense of positivity and trust regarding the value and simplicity of online learning systems by creating an interactive feature such as online discussion, live chat, screen-sharing, interactive digital whiteboard, etc. All of these features will increase students’ enjoyment in using online learning platform and their productivity.

Finally, by referring to the recognition that the level of enjoyment and emotional involvement experienced by students plays a crucial role in shaping their intentions to utilize
these platforms serve as a guiding principle for the enhancement of online learning environments that are both more appealing and effective. To foster learner engagement, educational institutions and platform developers may prioritize several key criteria, including user-friendly interfaces, comprehensive material offerings and the presence of highly effective instructors. Furthermore, the research highlights the significance of instructor preparation and advancement, placing emphasis on effective communication abilities, promptness in addressing concerns and the implementation of pedagogical strategies in the context of online instruction. With this understanding, educational institutions can enhance their ability to effectively train instructors in providing engaging and delightful online learning experiences. Moreover, the prioritization of PSE as a catalyst for the enjoyment of online learning holds practical implications for the provision of student support services. Educational institutions have the capacity to prioritize the cultivation of students’ self-assurance in their aptitude for online learning by offering a range of resources and support mechanisms aimed at bolstering their self-efficacy. This methodology has the potential to foster increased self-assurance and active participation among online learners, thereby enhancing the overall educational encounter inside the digital domain.

7. Limitations and future research directions
Similar to other studies, this study has several drawbacks. First, we only obtained sample data from two public HEIs in Malaysia. Although it is sufficient to describe the context of the higher education population of Malaysia, it is necessary to collect the background of a larger and more diverse demographics population. Hence, to apply the findings of the study to the entire Malaysian higher education system, future researchers should replicate the model in a larger sample that includes students from private sector HEIs as well as other HEIs in South East Asian countries. Second, a cross-sectional technique was used to investigate student’s enjoyment and intention to use online learning platform at one point in time. Future studies should apply a longitudinal approach to produce more reliable results when examining the dynamic changes of these two sentiments. Third, only three external variables were considered in this study (i.e. PSE, CRI and INS) and were based on TAM. Thus, future research must expand the model to include other external factors or combining with other important theories like diffusion innovation theory, task–technology fit, etc., that can impact students’ enjoyment since such factors will help in getting a better understanding about the perceived enjoyment among the students as well as their intention to using online learning platform.

On the other hand, a significant constraint of our study is lack of a specific variable that directly investigates the influence of choice on the experiences of both students and staff HEI member’s amid the COVID-19 epidemic. Although our study provides valuable insights into different aspects of LMS utilization and its implications in the context of online education, it does not thoroughly examine the intricate impact of the choices that participants have in terms of course selection and instructional approaches. The study’s major focus on other variables and aspects important to online education inherently limits our ability to fully comprehend the impact of choice dynamics on student satisfaction, engagement and academic performance. The lack of a specific choice variable indicates a wasted chance to investigate the impact of decision-making processes among students and staff on their online learning experiences during an unprecedented crisis like the COVID-19 epidemic. Future research endeavors should aim to integrate a comprehensive choice variable in order to examine the complex interplay between the presence of options, instructional approaches and the overall academic achievements. By acknowledging and examining this constraint, scholars can present a more intricate comprehension of the educational environment and propose customized suggestions for educational establishments and policymakers to improve the caliber of online education amongst difficult situations.
8. Conclusions
As a conclusion, this study provides novel insights that this extended TAM with PSE, CRI and INS are crucial component in creating a positive perceived online learning enjoyment among the HEI student’s that lead to positive BIN for using online learning platforms. These results add to understanding that HEIs may employ a suitable online learning platform design to successfully create a sense of strong perceived enjoyment among the HEI students. It is because our study found that sufficient technical equipment has a predictive value for the student’s PUSE and ease of use, in turn, stimulating their intention toward online education. In addition, in order to ensure the smooth adoption of online learning, the HEIs should find solutions to meet the learning needs by providing a quality education contents and also a competent online learning instructor’s is needed.

References


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