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Validating the Component of E-Learning Antecedents, Digital Readiness and Usage Behavior towards E-Learning Performance: A Pilot Study

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Abstract. With its plethora of benefits, E-learning has the potential to attract students to an educational environment. Unfortunately, E-learning can cause students to become passive learners. Most learning occurs asynchronously, and students typically feel estranged from their instructors and peers. This paper explains the pilot test approach to a proposed framework model based on E-learning antecedents, digital readiness, usage behavior and E-learning performance, before embarking on the extensive research necessary to develop best practices in E-learning. The content validity index and a pilot study were used to determine the usability and reliability of a survey questionnaire. Based on a simple random sampling plan, an online survey method was used to gather data from 102 respondents at the Universiti Teknikal Malaysia Melaka, Malaysia. The results indicate that the instrument's content validity index value is 0.97, which is significantly greater than the cut-off value of 0.8. The Cronbach alpha values for most of the constructs in the proposed framework model ranged between 0.905 and 0.970, indicating that the constructs are highly reliable. To contribute to the body of knowledge, the researchers provide an overview of the pilot test procedures as well as the methodology that was utilized. Based on the integration of the unified theory of acceptance and use of technology and task-technology fit models, a proposed framework model is presented to provide a more comprehensive framework model. It is concluded that the questionnaire items are adequate and acceptable for further investigation

on a broader scale. Thus, the instrument can be examined further in other settings.

Keywords: E-Learning antecedents; usage behavior; E-Learning Performance; pilot research

1. Introduction

In the past decennium, many higher education institutions have tried to boost students' education performance by utilizing emerging technologies that could provide novel approaches to providing and creating new environments in university education (Al-Kumaim et al., 2021; Deng & Tavares, 2013; Sun & Chen, 2016). E-learning was used by universities to assist in the delivery of academic resources, to improve communication between students and instructors, to encourage student learning communities, to monitor knowledge development in students, and to enable students to participate in E-learning courses (Kim et al., 2019; Rashid & Asghar, 2016; Zalat et al., 2021). E-learning platforms are developing rapidly, due to the popularization and promotion of network technologies and multimedia, such as high-definition video, high-speed Internet, and the smart tools and features of numerous learning management systems (Cidral et al., 2018; Zalat et al., 2021). E-learning offers students the opportunity to access, repeat, and utilize educational materials. Technological aids and approaches of E-learning platforms could promote education excellence and performance by providing optimized learning resources and schemes that are matched to each student's requirements and priorities (Kim et al., 2019). This phenomenon has stirred the belief that conventional learning could be fortified by E-learning.

The COVID-19 pandemic compelled changes in the way higher education institutions approach the teaching and learning process. The pandemic impacted the interaction between academics and students. Because of the way this virus is spread, universities, colleges and schools around the world were compelled to close, and to shift their courses online in order to keep teaching and learning going (Adams et al., 2021) – all their interactions with students had to be conducted through the Internet (Abdullah et al., 2020). The impact of the pandemic on universities' pedagogical activities was lessened by the implementation of mitigation strategies, such as flexible online learning and E-assessment (Rapanta et al., 2020). Universities were advised to opt for open distance learning as an alternative approach to teaching and learning, so that students and academics could interact remotely and limit interference in the educational process by the COVID-19 pandemic (Mustafa, 2020).

Higher education institutions should advance E-learning platforms, so that they become students' preferred teaching approach, or an auxiliary technique to conventional face-to-face lessons, so that students comprehend the technological procedures involved, become accustomed to the use of this technology and become digital natives (Parkes et al., 2015; Gherheş et al., 2021).

E-learning has slowly become the new norm. Students are being required to complete their coursework at home, in order to assist in the prevention and control of the pandemic (Adams & Dewitt, 2021). In this context, online learning has numerous advantages; however, students who participate in online learning may experience a loss of motivation, delayed feedback or too little assistance, because the majority of the learning takes place asynchronously and instructors are not always available at the times students require assistance while learning; students frequently feel disconnected from their lecturers and classmates, which cause students to become inactive learners (Vavasseur et al., 2020).

These consequences indicate that students were not ready or prepared for switching to entirely online learning. Few students had received adequate training to comprehend, operate, and apply E-learning packages effectively (Almaiah & Al-Khasawneh, 2020; Eze et al., 2020), which led to students having mixed perceptions about using E-learning (Kim et al., 2019). There is a paucity of empirical research in Malaysia that focused solely on students' engagement in E-learning experiences, and their performance (Adams et al., 2021). Therefore, this study intended to validate the component of E-learning antecedents, digital readiness, and usage behavior towards E-learning performance through a pilot study. The study makes a contribution to the evolution of the most effective procedures for application in an E-learning setting.

1.1 Purpose of the Pilot Study

A pilot study is a study that is undertaken before the main research is conducted; the aim is to determine whether an approach that is planned for a larger-scale study is feasible (Fraser et al., 2018). According to Van Teijlingen and Hundley (2002), the goals of a pilot study are to (a) evaluate the appropriateness of the research instruments; (b) establish the feasibility of the research procedures; (c) evaluate the viability of a full-scale project; d) provide specific answers in relation to logistical concerns; e) gather preliminary data; f) validate the sampling frame and method; g) determine the appropriate sample size; and h) persuade funding agencies that the planned extensive study is both doable and beneficial. It is recommended that a pilot study is carried out to ascertain the potential risks connected to the sample size, method of data collection, sample selection, data management, and data analysis (Memon et al., 2020). Hence, a pilot study is required to be carried out. Most published pilot studies were in medicine (Lancaster, 2015), leaving much to be desired in other fields (Van Teijlingen & Hundley, 2002). Fraser et al. (2018) suggest that more pilot studies need to be published, to facilitate knowledge exchange and improving subject recruitment and intervention delivery and allowing researchers to get a better idea of how many samples they need for a pilot study.

The main objective of this pilot study was to test or assess a questionnaire before it was deployed, in order to examine the feasibility of an approach that will be used in a larger scale study. The pilot study validated the instrument based on respondents' understanding, as indicated by their responses to a questionnaire. This analysis was carried out to determine how well respondents understood each item in the construct. The present endeavor contributes to the literature on the

topic of the research. The results of this pilot study will assist researchers to refine their plans for data collection, based on the data content and relevant procedures (In, 2017).

A pilot study is conducted on a relatively small sample, or as a trial, to ensure the success of the larger investigation. The adoption of certain research instrument is subject on its validity, since it has been proven by a pilot study. There are a number of guidelines for selecting the appropriate number of participants for a pilot study. For instance, Cooper and Schindler (2011) recommended a sample size of between 25 and 100 respondents. In turn, Hill (1998) and Isaac and Michael (1995) recommend that a pilot test should consist of between 10 and 30 participants. Whitehead et al. (2016) indicate that the minimum sample size for a pilot test of a large-scale survey is 40. However, Hair et al. (2018) state that the majority of research scenarios call for at least 50 samples and, in most cases, 100 samples (Memon et al., 2017; Memon et al., 2020), while Yusoff and Tengku Arifin (2021) explain that a pilot study's sample size could range from a few hundred to 200 in the case of a large-scale survey.

A total of 133 respondents were recruited for this pilot study. After the screening process, 102 social sciences students of the Universiti Teknikal Malaysia Melaka (UTeM), Malaysia, remained as a sample frame for the pilot test. The rationale for selecting social sciences students for this study related to the aim, namely to to gain an understanding of the level of self-efficacy and readiness regarding the usage of the E-learning system of social sciences students, since previous studies had indicated that engineering students had significantly higher self-efficacy regarding E-learning, compared to students with social sciences backgrounds (Fantz et al., 2011; Mamaril et al., 2016).

This study aimed to understand how social sciences students perceived their E-learning antecedents, readiness, usage behavior, and performance in relation to the use of E-learning platforms. Thus, the pilot study was carried out to accomplish the following objectives:

- To prepare a questionnaire that investigated the four main constructs, namely E-learning antecedents, digital readiness, usage behavior and E-learning performance;
- To examine the reliability and validity of the instrument utilized;
- To generate items for measuring E-learning antecedents and usage behavior in relation to E-learning performance.

2. Literature Review

2.1 E-learning in Higher Education

Over the last decade, the adoption of E-learning by higher education institutions worldwide has increased at a breakneck pace. Contributing to this surge are breakthroughs in education technology and the transition to 21st-century learning (Miller, 2018). In the past, E-learning was used mainly by colleges that offered distance learning programs (Osman et al., 2018). Today, E-learning in higher education may appear to be welcoming to a wide range of students as a result of the proliferation of inclusive technological tools and practices. E-learning features

or components are being incorporated into an increasing number of course formats, ranging from entirely online to blended and hybrid forms, with the goal of improving students' educational experiences (Yang, 2020).

Researchers have demonstrated a strong interest in examining the adoption of E-learning from various angles. One topic that has been extensively studied is the readiness of faculty and students to accept this form of learning (Cheng et al., 2019). E-learning has emerged as a potentially useful strategy for extending learning beyond the traditional confines of the classroom (Yang, 2020). Studies on students' readiness for E-learning or its variants were undertaken during the campus closures that were caused by the COVID-19 pandemic. This was because institutions started emphasizing E-learning as a means of mitigating the effects of the pandemic (Tang et al., 2021). Studies indicate that another critical area of effort for E-learning in higher education is overcoming implementation problems (Heilporn et al., 2021).

Despite some of the challenges that are commonly reported in Malaysia, such as a lack of infrastructure and institutional support, the outcomes of E-learning adoption as reported in Malaysian literature are predominantly positive. Jie and Fernandez (2021) discovered that, in small towns, maintaining a stable internet connection continues to be an issue. This finding is consistent with that of Azizan et al. (2021), who found that students' learning and E-learning performance continue to be hampered by limited internet access. To improve student performance, E-learning in higher education institutions should emphasize digital technologies, such as E-learning platforms, in developing educational materials for students, and should standardize courses in the university environment (Coman et al., 2020). Moreover, the utilization of this technology should be made compulsory for students at universities, to encourage information and communications technology (ICT) usage so that students are confident about using technology (Hailegebreal et al., 2022). Students' self-efficacy in using E-learning as the main platform of their learning process is expected to increase. Thus, a study is required to measure E-learning antecedents and usage behavior towards E-learning performance. This study is anticipated to contribute to the successful implementation of E-learning platforms in the Malaysian context.

2.2 Research Framework

Based on the research that was reviewed, Figure 1 proposes a framework model. This study is based on the integration of the unified theory of acceptance and use of technology (UTAUT) model as proposed by Venkatesh et al. (2003), and the task-technology fit (TTF) model as proposed by Goodhue and Thompson (1995) as an underpinning theory. The UTAUT model is a robust and validated model that is extensively used to examine the factors that could influence the adoption and use of information systems and technologies (Dwivedi et al., 2019; Zainab et al., 2018). Similarly, the empirical study results report that the TTF model is an effective model for analyzing information systems adoption and use behavior (D'Ambra et al., 2013; Vongjaturapat, 2018). Thus, the UTAUT and TTF models were used by this study to explain the development of the proposed framework model.

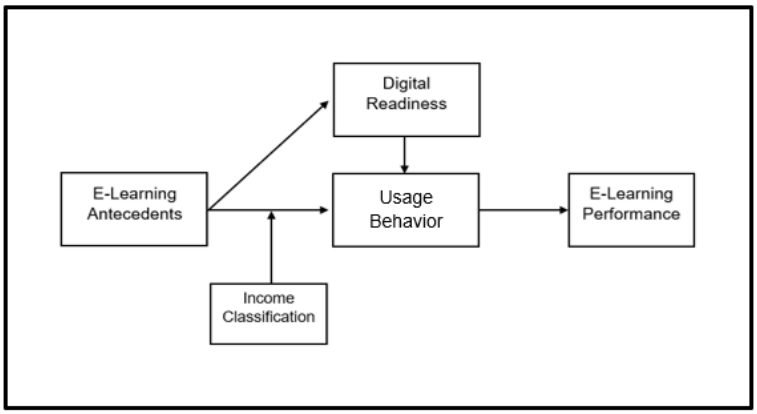

Figure 1: Proposed framework model

Initially, the UTAUT model was developed to forecast the acceptance of technology by users, and to assist in explaining users' intentions to use an information system, and their subsequent usage behavior (Ayaz & Yanartas, 2020). However, Dwivedi et al. (2019) claim that the UTAUT model omits some potentially significant relationships, and that others may not be applicable in all situations, such as the facilitating condition and behavior intention. Based on the findings done by Dwivedi et al. (2019), this study critically analyzed and refined the original UTAUT model, to advance theory and identify future research directions. Thus, omitting constructs such as facilitating condition and behavior intention may help to explain the findings more clearly, since the facilitating condition and behavior intention were found to be poor predictors, and tend to be unstable, which could affect the proposed model used in this study (Ajzen, 2020; Wedlock & Trahan, 2019).

This new model integrates the UTAUT model and the TTF model, which provides a more comprehensive model for examining E-learning usage behavior towards E-learning performance. The model below consists of six independent variables presented as E-learning antecedents that could influence student usage behavior towards E-learning performance: performance expectancy, effort expectancy, social influence, personal innovations, task characteristics, and technology characteristics. Additionally, digital readiness was introduced as a new construct to serve as a mediating variable. Digital readiness is the second-order model, which incorporates technical competencies, computer self-efficacy, and self-directed learning in a single parent construct.

To confirm the analysis, path analysis in structural equation modeling and bootstrapping were used to measure the total effect, the direct effect, and the indirect effect between the constructs. The algorithm compiled a table that includes the minimum and maximum values, as well as the two-tailed significant values, for the effects. The researchers used these values to compare the mediation test results with the bootstrapping results. In this study, income classification was employed as a moderator variable. Multi-group confirmatory factor analysis was adopted to assess the effect of the moderator variable included in the model, as

introduced via AMOS software (Feng et al., 2020). Finally, usage behavior may influence E-learning performance. E-learning performance is the outcome of the proposed framework model; therefore, 12 constructs were included in the proposed framework model.

3. Methodology

3.1 Research Design and Sampling

In this study, a cross-sectional survey research design was employed to collect the data. A total online survey was administered to 102 respondents of the Faculty of Technology Management and Technopreneurship, Universiti Teknikal Malaysia Melaka, who had been selected through simple random sampling. According to Krejcie and Morgan (1970), when the population size is 400, the minimum number of respondents for an adequate sample is 196. Since this survey was intended for a pilot study, 102 respondents were sufficient. Respondents were selected through simple random sampling because it was seen as the best way to provide the data, because each respondent had an equal chance of being chosen (Sekaran & Bougie, 2016). The sample consisted of students enrolled for Bachelors of Technology Management: Technology Innovation (30.4%), Supply Chain Management and Logistics (24.6%), and High Technology Marketing (23.5%), while 21.5% of respondents were enrolled for Bachelor of Technopreneurship. In accordance with specifications of this study, the respondents were chosen with the following criteria in mind: (1) respondents had to be first-year students with a social sciences background, (2) respondents had to be using E-learning at the time, and had to have been doing so for more than five months.

Before conducting the pilot test, a pre-test was undertaken, which involved asking experts and respondents to fill out the questionnaire, so that any flaws in the instrument or its design could be discovered and corrected (Babin & Zikmund, 2015). Doing so enables researchers to address any flaws in the questionnaire before disseminating the final version to the respondents, to minimize biases and improve the quality of survey-based research (Gaur et al., 2020). In this study, eight experts were recruited to participate in a pre-test of the data gathering instrument to uncover the instrument's shortcomings via the content validity index (CVI). In this case, the role of experts is fundamental in explaining, clarifying, adding, supplementing and modifying the necessary aspects (Zun et al., 2019). The content validity of the questionnaire that was used in this study was validated by panel members who held doctoral degrees in technology management, organizational behavior or management information systems, and who used E-learning platforms. This step ensured that the instrument was accurate and simple to grasp, and had undergone content validation via the CVI. Fernández-Gómez et al. (2020) define content validation through expert judgment as obtaining an educated view from people with experience of the subject, who are considered competent experts, and who can contribute information, evidence, judgments and assessments. Table 1 illustrates the information of the expert information verification applied in this study.

Table 1: Information on expert verification

Expert	Designation of expert	Area of expertise	Organization	Years of experience
Expert 1	Professor	Technology Management	Universiti Sains Malaysia (USM)	32
Expert 2	Professor	Management Information Systems	Universiti Teknologi MARA (UiTM)	22
Expert 3	Professor (Professional Technologies)	Organizational Behavior	Universiti Malaysia Pahang (UMP)	20
Expert 4	Associate professor	Technology Management & Information Systems	Universiti Malaysia Kelantan (UMK)	13
Expert 5	Associate professor	Organizational Behavior	Universiti Teknikal Malaysi Melaka (UTeM)	19
Expert 6	Associate professor (Professional Technologies)	Organizational Behavior (E-learning)	Universiti Malaysia Pahang (UMP)	21
Expert 7	Senior lecturer (Professional Technologies)	Management Information Systems (E-learning)	Universiti Malaysia Sawarak (UNIMAS)	20
Expert 8	Senior lecturer	Management Information Systems (E-learning)	Universiti Teknologi MARA (UiTM)	6

The questionnaire was modified in response to their feedback. Items were altered in light of the pre-test results, to amplify the face and content validity and the reliability of this study, based on their observations and understanding of the subject matter (Hasim et al., 2019). After the validation procedure had been completed, the data were collected. In this study, the data were collected using an online survey. The online questionnaire was completed by 133 people, but 31 of those responses had to be discarded because they were incomplete. Hence, data from 102 respondents were used for further analysis by this pilot study. All constructs were adapted and modified from previously validated studies, to boost transparency, as shown in Table 2. In the meantime, respondents provided informed consent and received an information sheet that explained the protocol and the purpose of the study. Anonymity was assured by detaching the participants' written consent from the questionnaire, so that the researcher could not disclose respondents' names in the research reports (Saunders et al., 2019). Respondents' information will not be reported publicly in a manner that identifies them (Ponto, 2015). Hence, the questionnaires were only numbered after data had been collected, and contained no identifying information.

4. Findings

The results indicate that the CVI value of the instrument is 0.97 – significantly higher than the cut-off value of 0.8 (Davis, 1992; Yusoff & Tengku Arifin, 2021). In this study, data from 102 respondents were analyzed using the Statistic Package for Social Sciences (SPSS) software version 26. The results, based on the CVR, indicates that all 62 recommended items were adequately preserved after expert judgment, as demonstrated in Table 2. Table 3 illustrates the frequencies of responses relating to demographic profile obtained in this study.

Table 2: CVI analysis

Item	Question	Panel Approval (√)									
		1	2	3	4	5	6	7	8	No. of Approvals	CVR
Performance Expectancy											
1.	I find E-learning to be a useful learning platform	√	√	√	√	√	√	√	√	8	1.00
2.	I am aware that the E-learning platform expedites the completion of my learning tasks	√	√	√	√	√	√	√	√	8	1.00
3.	I know E-learning platforms increase my effectiveness in learning	√	√	√	√	√	√	√	√	8	1.00
4.	I know E-learning platforms increase my productivity	√	√	√	√	√	√	√	√	8	1.00
5.	I know E-learning platforms improve my learning result	√	√	√	√	√	√	√	√	8	1.00
6.	I know E-learning platforms increase my learning motivation	√	√	√	√	√	√	√	√	8	1.00
Effort Expectancy											
1.	I am aware that the E-learning platform is intuitive	√	√	√	√	√	√	√	√	8	1.00
2.	I know E-learning platforms help me to improve my skills	√	√	√	√	√	√	√	√	8	1.00
3.	I have become proficient at using the E-learning platform	√	√	√	√	√	√	x	√	7	0.88
4.	I am confident that my interaction with the E-learning platform is lucid	√	√	√	√	√	√	√	x	7	0.88
5.	I am confident that my interactions with the E-learning platform are comprehensible	√	√	√	√	√	√	√	√	8	1.00
Social Influence											
1.	People who influence my behavior think that I should use the E-learning platform	√	√	√	√	√	√	√	√	8	1.00
2.	People who are significant to me believe that I should utilize the E-learning platform	√	√	√	√	√	√	√	√	8	1.00
3.	My lecturers believe I should utilize the E-learning platform	√	√	√	√	√	√	√	√	8	1.00
4.	My department's administration is supportive of the E-learning platform	√	√	√	√	√	√	√	√	8	1.00
5.	The university has generally supported the use of the E-learning platform	√	√	√	√	√	√	√	√	8	1.00
Personal Innovativeness											
1.	I am someone who is willing to try out a new E-learning platform	√	√	√	√	√	√	√	√	8	1.00
2.	I am usually the first of my peers to try out an E-learning platform	√	√	√	√	√	√	√	√	8	1.00
3.	I do not hesitate to try out the E-learning platform	√	√	√	√	√	√	√	√	8	1.00
4.	I am someone who has a positive mindset to experiment with the E-learning platform	√	√	√	√	√	√	√	√	8	1.00
5.	I prefer to use creative learning methods during my study (such as E-learning platform)	√	√	√	√	√	√	√	√	8	1.00
6.	I discovered that I am interested in the E-learning platform	x	x	√	√	√	√	√	√	6	0.80
Task Characteristics											
1.	I understand E-learning platform allows me to learn whenever and wherever I want	√	x	x	√	√	√	√	√	6	0.80
2.	I frequently seek advice from others to handle my learning problems in easier ways	√	√	√	√	√	√	√	√	8	1.00
3.	I frequently acquire knowledge by gathering data from others	√	√	√	√	√	√	√	√	8	1.00
4.	I frequently need interaction throughout the learning process	√	√	√	√	√	√	√	√	8	1.00

5.	I frequently need timely feedback throughout the learning process	√	√	√	√	√	√	√	√	8	1.00
Technology Characteristics											
1.	I am aware E-learning platforms encourage active engagement with students	√	√	√	√	√	√	√	√	8	1.00
2.	I feel the E-learning platform is convenient since I can study anytime and anywhere	√	√	√	√	√	√	√	√	8	1.00
3.	I always have the option of synchronous or asynchronous interaction via the E-learning platform	√	√	√	√	√	√	√	√	8	1.00
4.	I always have the option to interact with the E-learning platform via video, audio, images, or text	√	√	√	√	√	√	√	√	8	1.00
5.	I am aware the technological features of the E-learning platform are appropriate for supporting successful learning	√	√	√	√	√	√	√	√	8	1.00
6.	I am aware E-learning platform can provide me with good folder-sharing and data synchronization function	√	√	√	√	√	√	√	√	8	1.00
7.	I am aware E-learning platform can allow me to access files/information on different devices and cross the operating systems	√	√	√	√	√	√	√	√	8	1.00
Digital Readiness (Technical Competencies)											
1	I am confident in my ability to use the E-learning platform for specific tasks	√	√	√	√	**x**	√	√	√	7	0.88
2	I am proficient at using a wide variety of E-learning platform	√	√	√	√	√	√	√	√	8	1.00
3	I am comfortable using the E-learning platform	√	√	√	√	√	√	√	√	8	1.00
4	I am able to articulate the advantages of utilizing an E-learning platform in my learning process.	√	**x**	√	√	√	√	√	√	7	0.88
5	I am able to incorporate E-learning platforms into my learning activities.	√	√	√	√	√	**x**	√	√	7	0.88
6	Using the E-learning platform inspires me to engage in more learning activities.	√	√	√	√	√	√	√	√	8	1.00
Digital Readiness (Computer Self-Efficacy)											
1	I am competent with fundamental Microsoft Office program operations	√	√	√	√	√	√	√	√	8	1.00
2	I am confident in my ability to manage online learning software	√	√	√	√	√	√	√	√	8	1.00
3	I am confident in using the Internet to search for information	√	√	√	√	√	√	√	√	8	1.00
4	I am confident in my ability to learn new ICT tools on my own	√	√	√	√	√	√	√	**x**	7	0.88
5	I am confident in my ability to solve any technical issues that may arise	√	√	√	√	√	√	√	√	8	1.00
6	I am confident that I can use ICT tools efficiently	√	√	√	√	√	√	√	√	8	1.00
Digital Readiness (Self-Directed Learning)											
1	I follow my own study schedule while studying online	√	√	√	√	√	√	√	**x**	7	0.88
2	I seek help when I encounter difficulties with online learning	√	√	√	√	√	√	√	√	8	1.00
3	I effectively manage my time while studying online	√	√	√	√	√	√	√	√	8	1.00
4	I planned out the objectives for my online education	√	√	√	√	√	√	√	√	8	1.00
5	I have a high expectation for my online learning process	√	√	**x**	√	√	√	√	√	7	0.88
Usage Behavior											
1	I consider myself a regular user of the E-learning platform	√	√	√	√	√	√	√	√	8	1.00

2	I do most learning tasks by using the E-learning platform	√	√	√	√	√	√	√	√	8	1.00
3	Whenever possible, I use the E-learning platform	√	√	√	√	x	√	x	√	6	0.80
4	I frequently use the E-learning platform for my regular tasks	√	√	√	√	√	√	√	√	8	1.00
5	I intend to utilize the E-learning platform frequently in the future.	√	√	√	√	√	√	√	√	8	1.00
E-learning Performance											
1	Using E-learning helps improve my academic performance (such as CGPA)	√	√	√	√	√	√	√	√	8	1.00
2	Using E-learning allows me to think through challenges more effectively	√	√	√	√	√	√	√	√	8	1.00
3	Using E-learning enables me to improve my competitiveness during the study	√	√	√	√	√	√	√	√	8	1.00
4	Using E-learning allows me to respond more quickly to change	√	√	√	√	√	√	√	√	8	1.00
5	Using E-learning assists me in achieving my learning outcomes	√	√	√	√	√	√	√	√	8	1.00
6	In general, I find that E-learning is helpful in organizing my academic work	√	√	√	√	√	√	√	√	8	1.00
										Content Validity Index (CVI)	**0.97**

CVR = (Ne−N/2)/(N/2) involved eight expert panels (n = 8); items with CVR values of 0.8 and above were retained, because they served adequately as instrument-forming items.

Table 3: Respondents' demographic profile (*N = 102*)

Variable	Category	Frequency	Percentage
Gender	Male	29	28.4
	Female	73	71.6
Race	Malay	72	70.6
	Chinese	14	13.7
	Indian	5	4.9
	Other	9	10.8
Age	19–20 years	8	7.8
	21–22 years	90	88.2
	23–24 years	4	3.9
Religion	Muslim	79	77.5
	Buddhist	14	13.7
	Christian	7	6.9
	Hindu	2	2.0
Direct entry from (education status)	Matriculation/Foundation/A-level/O-level	7	6.9
	Sijil Tinggi Persekolahan Malaysia (STPM)	89	87.3
	Diploma	6	5.9
Program	Bachelor of Technopreneurship	22	21.5
	Bachelor of Technology Management (High Technology Marketing)	24	23.5
	Bachelor of Technology Management (Technology Innovation)	31	30.4
	Bachelor of Technology Management (Supply Chain Management & Logistics)	25	24.6
CPGA	Low (< 3.00)	23	22.5
	Average (3.00–3.49)	57	55.9
	High (3.50–4.00)	22	21.6

Hair et al. (2010) describe reliability as an assessment of the consistency of variables. This assessment is essential, because it can determine an instrument's value and ensure that it has relevant value to the field of study. Thus, any instrument's reliability should be evaluated before its validity is determined (Hair et al., 2011). According to Sekaran and Bougie (2016), the four most frequently used reliability procedures are test-retest, alternate forms, split halves, and Cronbach's alpha. This study used Cronbach's alpha to determine the consistency of the scale overall. Cronbach's alpha is a statistical technique used by a study to determine the reliability of constructs. An alpha value greater than 0.7 is considered acceptable (Cortina, 1993; Nurakun et al., 2018). A study done by Taber (2018) also indicated that a Cronbach's alpha range of 0.7 and above is acceptable for behavioral research purposes. Table 4 depicts the rule of thumb for Cronbach's alpha that was used in this study to determine reliability.

Table 4. The rule of thumb for Cronbach's alpha coefficient

Cronbach's Alpha Coefficient Range	Strength of Association
0.9 and above	Very high
0.70 ≤ to < 0.90	High
0.50 ≤ to < 0.70	Moderate
0.30 ≤ to < 0.50	Low
< 0.30	Very low

Adopted from Taber (2018)

The reliability analysis was performed to determine the alpha coefficients for each construct and the internal consistency of each item (Cronbach, 1951). In this study, most of the alpha coefficients of the constructs ranged from 0.905 to 0.970. All the constructs achieved scores of at least 0.7, which means that Cronbach's alpha values for all constructs indicate excellent internal consistency.

It ought to be indicated that an instrument's validity is closely related to its reliability – an instrument cannot be valid unless it is reliable. Furthermore, Taber (2018) asserts that a reliability of greater than 0.70 is perfectly adequate. In other words, the greater the difference between Cronbach's alpha value and 1.0, the higher the degree of reliability. Based on the Cronbach's alpha coefficient value, the questionnaire was deemed acceptable and reliable to use, as specified by Taber (2018), indicating that acceptable coefficient alpha values must be greater than 0.7, as illustrated in Table 5.

Table 5: Reliability results

Construct	Number of Items	Mean	Standard Deviation	Cronbach's Alpha
Performance Expectancy	6	5.7680	0.95099	0.948
Effort Expectancy	5	6.2824	0.75116	0.967
Social Influence	5	5.8353	0.83128	0.905
Personal Innovativeness	6	5.7680	0.84339	0.924
Task Characteristics	5	5.9333	0.90645	0.970
Technology Characteristics	7	5.8431	0.85915	0.953

Technical Competencies	6	5.7614	0.88550	0.953
Computer Self-Efficacy	6	5.7320	0.89065	0.944
Self-Directed Learning	5	5.6961	0.86824	0.934
Usage Behavior	5	5.7980	0.89950	0.959
E-learning Performance	6	5.7663	0.89130	0.952

5. Conclusion

After a comprehensive pilot study, this study successfully established the validated research instruments and enhanced the research design for the substantive investigation. This crucial phase of the piloting process uncovered several challenges, including concerns about the usefulness of the instruments and their transferability. In fact, the integration of the UTAUT and TTF models will produce a more comprehensive framework model for investigating the variables used in this study. Furthermore, this study empirically examined and validated the existing questionnaire in the study context via the CVI and pilot study. The present study found the instrument's CVI value to be 0.97, which is significantly greater than the cut-off value of 0.8. All 62 recommended items were retained, based on expert judgment. The findings of the pilot study demonstrate that an online survey is appropriate and conducive for a large-scale survey.

At the moment, the methodological literature gives scant guidance on how pilot studies can be used to evaluate the practicability of various aspects of the novel intervention, including recruitment, randomization, retention, assessment procedures, and new methods in research. Hence, this study contributes to a greater understanding and awareness of how pilot studies might influence knowledge and aid in the development of high-quality research – a problem that merits more debate in published literature. Empirically, the UTAUT and the TTF models might be an effective research framework for accessing E-learning antecedents and usage behavior towards E-learning performance. The validation of these items contributes to knowledge development by expanding the body of knowledge (literature), and it indicates that validation items are reliable and adequate for use in E-learning practice. Hence, the instrument that was used can be examined further in various settings.

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