Factors Affecting the Continued Use of E-Learning Among Socioeconomically Disadvantaged

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ARTICLE INFO	ABSTRACT
	The integration of e-learning in higher education sector presents both exciting opportunities and significant challenges. While e-learning has the potential to revolutionize personalized learning, flexibility and lifelong learning continued use as a new norm in learning process need careful attention. The survey method was conducted when the COVID-19 quarantine period had been removed and the learning process was still mandatory to attend lectures through e-learning as a teaching medium. An electronic survey of 25 items was conducted to identify the population of socioeconomically disadvantaged students towards continued use of e-learning during post-pandemic. A survey was used to measure variables including performance expectancy, effort expectancy, social influence, facilitating conditions, and perceived advantage, among a sample of 424 students. Descriptive statistics analysis was conducted to evaluate the relationships between variables. The findings of this survey on the factor affecting continued use of e-learning, the variable of performance expectancy, effort expectancy, social influence, facilitating conditions, and perceived advantage, have a statistical impact on the continued use of e-learning. These findings can significantly impact policy decisions, educational practices, technological advancements, and the overall social landscape, promoting inclusive and accessible education for all.

1. Introduction

The COVID-19 pandemic has undeniably induced significant changes in various industries, including the education sector. Numerous provided research study offered insights into how COVID-19 has affected different industries, e.g., disruption in the supply chain [1], employment [2], changing shopping habits [3], acceleration of digital transformation [4], increasing technology adoption [5] and financial technology [6]. As industries continue to evolve, the demand for a skilled and adaptable workforce to new situation are crucial. Ultimately, COVID-19 has reshaped

industries, forcing the players to adapt to new realities, accelerate digital transformation, and prioritize resilience.

Education has also portrayed several changes in the wake of the COVID-19 pandemic. Among the changes are a shift to online learning [7], innovative teaching methods [8], technology-enhanced learning [9], curriculum adjustment [10], and adaptive learning to develop new study habits [11]. Effects from these changes are likely to prolong even in the future education system with a heavy emphasis on online and technology-driven learning methods. Despite Malaysia's significant advancements in educational research, particularly in e-learning, universities encounter several obstacles in fully leveraging online education. These challenges encompass diminished student engagement, mental health concerns, social isolation, difficulties for educators in adopting new teaching methodologies, and the discontinuation of learning programs [12], [13], [14]. While e-learning's potential for enhancing education showed a rapid increasing trend in e-learning publications, with focus on theme such as acceptance factors and technologies integration [15], socioeconomically disadvantaged students are at greater risk of experiencing disruptions and disengagement due to digital divide and other socioeconomic factors.

The current challenges faced by this community are low levels of technology preparedness [16], urban-rural disparities in infrastructure and connectivity, and continuing to rely on the government for various digital initiatives. In context of education, various study revealed among the challenges faced by most low-income families are parents' resistant to e-learning [17], financial constrain and privacy issues [18], [19], adaptation difficulty [20], poor academic performance [21], and difficulty in engaging in e-learning process [22]. By studying this specific group, researchers can gain valuable insights into optimizing e-learning implementation and addressing potential learning gaps. In Malaysia, a socioeconomic disadvantaged group or B40 community classified as a person or group live together with monthly household incomes below RM4850 (approximately USD 1043). In the state of Kelantan, Terengganu and Pahang faces specific development challenges in area like infrastructure, education and economic opportunities compared to other regions of the country. These specific challenges can negatively impact the continuity of e- learning use among students in several ways such as lack of access to devices, limited exposure to technology and lower income level.

Despite Malaysia's active contributions to e-learning research, ongoing studies remain vital to adapt to evolving needs, address specific challenges, and foster continuous improvement in e-learning methodologies and implementations. As education is essential in the development of individuals, it is necessary to continue further observing and comprehending students' preferences and preparedness toward e-learning, specifically among socioeconomic disadvantaged as well as the appropriate attributes that could enhance the efficacy of e-learning. This study contributes new insights into the potential of e-learning to bridge the digital divide and empower individuals from disadvantaged backgrounds in the Malaysian context. Thus, the primary objective of this study is to illustrate the factors affecting the continuity e-learning use in this community. This study proposed an extended version of the UTAUT model that include perceived advantage.

The selection of e-learning as the focus of this study due to the adaptability skills is a crucial in e-learning for developing future professionalism due to several significant reasons such as embracing new technology advancements, adaptability varied learning environment, adjusting learning strategies as e-learning often require troubleshooting technical issues and last but not least, fostering mindset that embraces change.

2. Literature Review
2.1 Socioeconomically Disadvantaged

This country has implemented various policies since the early 1970s to support economically disadvantaged Malays and indigenous natives, such as preferential opportunities for employment, land, and house ownership. Despite these efforts, income disparities persist among and within ethnic groups in the country. In Malaysia, the B40 group refers to the bottom 40% of income earners in the country. This income classification system categorizes Malaysians into three main groups based on their income levels: the Bottom 40% (B40), the Middle 40% (M40), and the Top 20% (T20). The B40 group represents the lowest 40% of earners, while the M40 group signifies the middle 40%, and the T20 group denotes the top 20% of income earners [23].

Currently, 3.16 million Malaysians belong to the B40 group. The range of characteristics of this population less income, less adequate accommodation, and insufficient resources for survival. Kelantan and Terengganu, located in the northeastern region of Peninsular Malaysia, are predominantly Malay states with distinct demographic and economic characteristics. The ethnic composition dominated by Malays making up 97% compared to Chinese and India [24]. Moreover, the choice of Kelantan and Terengganu due to these both areas are among the less economically developed states in Malaysia [25]. The lower socio-economic status in these regions can impact students' access to technology and the internet, which are crucial for effective e-learning. A study on the impact of parents' socioeconomic status on academic achievement in Malaysian public universities highlights that students from lower socio-economic backgrounds may face challenges in accessing necessary resources for online learning [26].

Previous studies have shed light on the challenges faced by socioeconomically disadvantaged populations in the continuity of e-learning. These studies highlight significant barriers that hinder access to online education for individuals from lower socioeconomic backgrounds such as motivation and access barriers [27], poor infrastructure [28], digital inequality [29] and limited support system [30]. While research exploring the potential of e-learning in Malaysia is growing, several valuable research has limitation in addressing the specific needs and experience of socioeconomic disadvantaged that hinder our understanding of its impact on the socioeconomically disadvantaged regarding e-learning continuity use [31], [32]. Therefore, creating inclusive e-learning strategies that cater to the diverse needs of socioeconomically disadvantaged populations may provide adequate support for technology literacy and enhancing interaction in digital learning environments.

2.2 E-learning

Advanced technology in education have had a substantial impact over time [33]. E-learning is an advanced online platform created to enhance the effectiveness of education via the utilization of digital tools and communication [34] E-learning has the capability to distribute content in a variety of formats, including on-demand lectures and videos, multimedia components [35], diverse forms of electronic files, online courses and lectures. It offers several benefits for students in flexibility of learning style and adjusts the difficulty level and learning pace based on the student's performance. Moreover, the rapid progression of technology holds immense promise for the ideal of leaving no one behind in education.

As education-based technology has evolved, mobile learning has become an essential landscape of tertiary education to allow students to access knowledge at any time and from any location. The powerful of mobile phone not just become a portable gateway to knowledge but also transforming the way educators deliver and facilitate learning. As mobile learning gain popularity

for future education, its widely acknowledged benefits have captured the attention of experts, educators, learners and all whom see its potential to transform education [36], [37].

Research indicates students from lower-income backgrounds frequently encounter significant obstacles in accessing e-learning resources, primarily due to limited availability of necessary technology and reliable internet connections [38],[39]. This digital divide can intensify existing educational disparities, as these students may find it challenging to fully engage in electronic learning environments. In Malaysia, the variation in digital literacy significantly hinder access to e-learning, particularly among marginalized communities. Despite the spread of online educational resources, obstacles such as digital poverty, inadequate infrastructure, and financial constraints hinder effective utilization [40]. Students lacking adequate digital skills often struggle to navigate online educational platforms, which can lead to reduced engagement and poorer academic outcomes.

2.3 UTAUT

A major area of study in the field of information systems involves the acceptance and recognition of new technological innovations by users [41]. The Unified Theory of Acceptance and Use of Technology model (UTAUT) was developed by [42] by combining various other models and theories. UTAUT is designed to assess the acceptance and usage of information technology (IT) in an organization as well as the possibility of implementing new IT innovations [43]. UTAUT is a relevant theory for several key reasons such as a well comprehensive model, strong predictive power in various studies, and its credibility and reliability in understanding how individual and organizations respond to technological change, especially in the evolving landscape of the post-pandemic world [44], [45].

The UTAUT consists of four moderators namely, gender, age, voluntariness, and experience in order to consider subjects from a variety of organizations with very different backgrounds. However, this study focuses on higher education students of similar ages and backgrounds. Therefore, the four moderators in the UTAUT model were not taken into account in this study.

2.3.1 Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Condition, Perceived Advantage, Intention Continue Use
2.3.1.1 Performance Expectancy

In relation to the use of technology, performance expectations refer to the range of individual believes that using the technology will enhance job performance [46]. PE refers to students' belief that e-learning can assist them in achieving their learning objectives more efficiently and effectively [47].

H1: Performance expectancy (PE) has a positive influence on the behavioural intention to continue use of e-learning

2.3.1.2 Effort Expectancy

Effort expectancy (EE) represents how easy it is to use the technology [48]. Effort expectancy refers to the practical convenience of individuals with limited resources, contributing significantly to their willingness and use of e-learning platforms [49].

H2: Effort expectancy (EE) has a positive influence on the behavioural intention to continue use of e-learning

2.3.1.3 Social Influence

Social influence (SI) refers to an individual's behaviour intention is influenced by external social surroundings, including peer and instructor reflections and subjective social situations [48].

For groups that are less fortunate in terms of socioeconomics, emphasis on community views, encouragement and direction in fostering long-term engagement while facing challenges related to e-learning.

H3: Social Influence (SI) has a positive influence on the behavioural intention to continue use of e-learning

2.3.1.4 Facilitating Condition

Facilitating conditions (FC) represent to what people believe the infrastructure, resources, and help they can access to use a specific technology in an efficient manner [40]. It is reasonable to believe when certain people lack technology literacy and while the technology development is still at infancy use, the role of institutions play in supporting them in positively influence their desire to utilize e-learning.

H4: Facilitating condition (FC) has a positive influence on the behavioural intention to continue use of e-learning

2.3.1.5 Perceived Advantage

In marketing, perceived benefits refers to the value derived by customers from any service or product [50]. Additionally, further study found that other factors lead to customers' perception regarding benefits and proven positively impact to users' intention use technology services. There is the importance of good value for money value [51], good bargain [52] and achieving better result [53].

H5: Perceived Advantage (PA) has a positive influence on the behavioural intention to continue use of e-learning

2.3.1.6 Behavioural Intention continue use

[54] has stated that behaviour intention refers to the probability of usage a particular brand in a particular product category during the usage process. In a situation where the person perceives additional difficulties in performing, the performer's desire to do so will decreases.

H6: Behavioural intention promotes the continued use of e-learning positively.

3. Research Methodology

The present study exploring factors affecting continuity use of e-learning among socioeconomically disadvantaged students' population from Kelantan and Terengganu. These locations were selected due to their low urbanization rates. Urbanization in Malaysia context refers to the status change of a residential area from rural to city [25]. Urbanization is illustrated from the development of basic needs of people, including health, accommodation, increasing demand for internet access, better education and employment, and higher income. On the other hand, less developed areas, are often pictured with limited available facilities comparison to urban areas.

A complete survey constructed for respondents from the aforementioned three different locations was conducted online using Google forms. The questionnaire was disseminated among diverse sample number (n=424) involving only low-income students' group for the month November/December 2022. In this study, respondents were required to choose a range of answers listed in Likert scale format of 1 to 5. The main principle of the research is to access the continuance use of e-learning among socioeconomically disadvantaged graduates in post- pandemic context. Each questionnaire was divided into three sections. The sections were demographic background, independent variable (Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions and Perceived advantage) and dependent variable (behavioural intention to continue use).
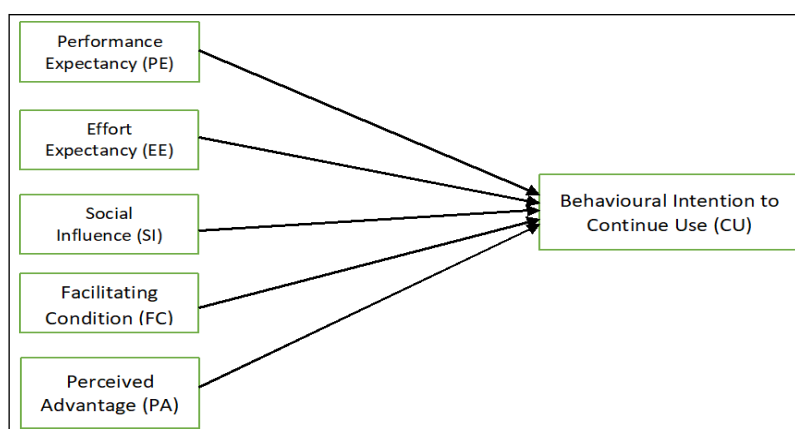

Fig 1. Conceptual Model

3.1 Participants

A self-administered questionnaire was designed to collect data from students of three different states of Malaysia. A survey was conducted on targeted university students of different academic years to confirm the validity of the questionnaire. WhatsApp application and email were utilized as the medium for the online questionnaire distribution among the targeted respondents. The questionnaire was set in dual language (English and Malay) to facilitate ease of understanding with Malay language as reference, and ultimately provide convenience for responding process. All participants provided written informed consent their information would be used exclusively for research purposes and that confidentiality would be maintained.

The survey was administered using purposive sampling at university college located in targeted area in Kelantan and Terengganu. The rational collecting data from targeted university was to concentrate study on a specific demographic within that institution. The targeted respondents consist of students who have a record family with lower income or the recipient of Perantisiswa which is Malaysia's government supported tablet initiative for low-income communities. Table 1 shows the gender distribution nearly equal distribution between male and female participants. A total of 53.78% (n=228) of the respondents were females whereas 46.22%(n=196) were male. 53.54% of the respondents belong to the age group 21-23 years, 36.08% are in the age group 18-20 and 10.38% students are 24 and above years of age. For level of education, fairly various groups of students have been included in the study which is diploma level represent 51.65% and degree level 48.35%.

Table 1
Descriptive statistics of respondents (n=*424*)

Measure	Value	n	Percentage
Gender	Male	196	46.22
	Female	228	53.78
Age	18-20	153	36.08
	21-23	227	53.54
	24 and above	44	10.38
Level of Education	Diploma	219	51.65
	Degree	205	48.35

3.2 Questionnaire

The study utilized a quantitative methodology through a survey. The surveys were designed to identify the factor that impact the continuity intention to utilize e-learning process among socioeconomically disadvantaged among higher education population in Kelantan and Terengganu. Each question was also closed-ended. The target respondents were from the B40 group only. To measure the degree of continuity, questions listed in Table 2 are asked on five- point Likert Scale-based statements ranging from "Strongly Disagree" to "Strongly Agree". This choice aligns with previous establish research in the field of education, where 5-point Likert scales have been demonstrably effective in capturing student attitudes and experience [28] and long and complex survey are potentially to burden respondents which could lead to no response or careless response rate [49].

Table 2
Continuity use of e-learning (*N* = 424)

Performance Expectancy	Adapted from:
1. Online learning useful for my learning needs	
2. Using online learning enables me to accomplish learning more quickly	[42]
3. Using online learning increases my productivity	
4. Using online learning increases my chances of achieving things that are important to me	

Effort Expectancy	
1. I find online learning easy to use	[42]
2. My interaction with online learning site is clear and understandable	[50]
3. It is easy for me to become skilled at using online learning	
4. Learning to use online learning is easy for me	

Social Factors	
1. I would use online learning system if my lecturers recommend and support using it.	[50]
2. I would use online learning system if people who are important to me will think that I should use it.	[51]
3. I would use online learning system if it receives support from media.	
4. I would use online learning system if my college encourages and supports using it.	

Facilitating Conditions	

1.	I have resources necessary to use online learning after pandemic.	[50]
2.	I have the knowledge necessary to use online learning.	[51]
3.	Online learning is compatible with other technologies that I use.	
	Perceived Advantage	
1.	Online learning is good value-for-money and efforts.	[52]
2.	Online learning appears to be a good bargain.	
3.	I consider Online learning to be a good value.	
	Behaviour Intention Continue Use	
1.	If I have the chance, I will use online learning after pandemic.	
2.	I'm expecting I will continue use online learning after pandemic.	[42]
3.	In the near future, I will use the online learning apps.	
4.	I will maintain use online learning even after pandemic.	

4. Result and Discussion

4.1 Profile of the sample respondents

The survey was administered using purposive sampling at university located in targeted area in Kelantan and Terengganu. The rational collecting data from targeted university was to concentrate the study on a specific demographic aligned with the objective of the study. The respondents consist of students who have a record family with lower income or the recipient of Perantisiswa which is Malaysia's government supported tablet initiative for low-income communities. Table 1 shows the gender distribution nearly equal distribution between male and female participants. A total of 53.78% (n=228) of the respondents were females whereas 46.22%(n=196) were male. 53.54% of the respondents belong to the age group 21-23 years, 36.08% are in the age group 18-20 and 10.38% students are 24 and above years of age. For level of education, fairly various groups of students have been included in the study which is diploma level represent 51.65% and degree level 48.35%.

4.2 Reliability Test

Cronbach's alpha was used to assess the reliability of the constructs in this study, with values exceeding 0.70 indicating good internal consistency [60]. As shown in Table 3, Cronbach's alpha value is little over 0.90 and hence holds good internal consistency allowing for further analysis.

Table 3
Reliability of the Constructs

Constructs	No of items	Mean	Cronbach's alpha (CA)	Standard Deviation
Performance Expectancy	4	3.74	0.939	0.936
Effort Expectancy	4	3.74	0.927	0.936
Social Factors	4	3.87	0.933	0.851
Facilitating Conditions	3	3.82	0.911	0.880
Perceived Advantage	3	3.79	0.911	0.890
Intention Continue Use	4	3.78	0.956	1.00

In Table 4, the coefficient matrix below shows the strength of the relationship between model and the dependent variable. The value of R is 0.915 indicating a strong positive correlation between the independent and dependent variables. The R square value is 0.837, meaning that 83.7% of the variability in the dependent variable is explained by the independent variables in the model. This is a good fit, showing the model's effectiveness. The chose predictors also contribute significantly as the number of adjusted R square is very close to the R square. Lastly, a low value of standard error suggests a better fit of the model to the data.

Table 4

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.915[a]	.837	.835	.40911

a. Predictors: (Constant), Perceived_advantage, Social_influence, Effort_Expectancy, Facilitating_Condition

Table 5 and Table 6 shows the finding of the study. Based on the results, the positive value of Beta value and P-value proved all the independent variables significantly influence the intention continue use of e-learning among socioeconomic disadvantage group.

For performance expectancy (PE), the p-value indicates the variable significantly influence continuity use of e-learning. The respondents to strongly agree with the statements or questions provided in the survey. Moreover, a mean value in this variable suggest that respondents believe the capability of e-learning platforms improves their academic performance or learning outcomes despite facing socioeconomic challenges.

For effort expectancy (EE), factor of economic and geographical inequalities could limit access to devices and high-speed internet, making e-learning challenging for some students. Despite these challenges, the positive perception could be influenced by other factors such as user-friendly platforms, clear instruction and adequate support system that contribute to favorable environment for e-learning. While e-learning offers flexibility and convenience, this potential of technology can be a powerful tool for narrowing educational gaps among those contending with socioeconomic challenge.

For component social influence (SI), this variable indicated statistically significant for the continuity use of e-learning in post-pandemic era. It highlighted the importance of providing e-learners with enhanced social features, promoting instructor-student and peer-to-peer interaction. Encouragement from peers, mentors, or educators can increase the confidence of disadvantaged populations in navigating e-learning platforms, helping to overcome potential those who may have low technological and digital literacy.

On the other hand, the perceived advantage (PA) component was indeed crucial for underserved students to continue using e-learning in the post-pandemic era. Underserved students often face unique challenges, and their perception of the value of e-learning can impact their willingness to engage with online education. A positive result indicated that most respondents found e-learning valuable. The flexibility in scheduling, accessibility from anywhere, and cost-effectiveness cater to the unique challenges faced by socioeconomically disadvantaged populations, providing them with education opportunities that would otherwise be hindered due to financial constraints, geographical limitations, or time commitments. Even this population often constraint by financial limitations, the features of e-learning make it more feasible for those facing financial challenges.

Last but not least, the intention continues use (CU), research results indicated that all the variables including performance expectancy, effort expectancy, social influence, facilitating

conditions, and perceived advantage contributed on the continued use of e-learning. This suggests that these factors play a role in influencing individuals to use e-learning as a learning medium in post-pandemic context. However, a larger standard deviation in the responses implied higher variability or dispersion in the data. This infers that the responses from participants regarding their intention to continue use e-learning may vary more widely. Overall, it is suggested that not all participants' opinions or intentions align closely, as observed by the greater diversity in the responses.

Table 5
Coefficient matrix

Model				Standardized Coefficients Beta	t	Sig.
1	(constant)	-.366	.094		-3.883	.000
	Performance_Expectancy	.148	.041	.148	3.583	.000
	Effort_Expectancy	.232	.053	.216	4.358	.000
	Social_influence	.131	.045	.111	2.906	.004
	Facilitating_Condition	.201	.048	.176	4.177	.000
	Perceived_advantage	.385	.049	.341	7.929	.000

a. Dependent Variable: Continue_Use

Table 6
Result of hypothesis testing

Hypothesis Path	Standardized Coefficients	P-value	Result
PE → CU	.148	.000	Support
EE → CU	.216	.000	Support
SI → CU	.111	.004	Support
FC → CU	.176	.000	Support
PA → CU	.341	.000	Support

5. Conclusion

This study has proposed a conceptual model for understanding the factor affecting the continuity use of e-learning in post-pandemic context among socioeconomically disadvantaged communities specifically among underserved students in higher education. Understanding the needs of underserved students will minimizing educational inequities and fostering a more equitable learning environment. The results show that five constructs have strong effect on the users' continuance intention decision, namely performance expectancy, effort expectancy, social influence, facilitating condition and perceived advantage. The additional variable which is perceived advantage emerges as the strongest predictor based on the highest absolute value of the beta coefficient. They might have a stronger awareness of the importance of education and skills to improve their future prospects. They might perceive e-learning as a valuable tool to acquire knowledge, develop skills, and potentially enhance their employability. This perception of future benefits could contribute to their continued engagement with e-learning platforms.

These findings complement existing theories that emphasize the importance of perceived advantages in technology adoption and continued use. This includes theories like the Technology Acceptance Model (TAM) and the Theory of Planned Behavior (TPB), which highlight perceived usefulness and perceived ease of use as key factors influencing technology adoption.

The study also revealed a strong agreement toward the preference of the new style of learning, whereas traditional learning is still considered as a dominant method. The implications from this observation include the necessity for educational institution and educators to recognize the preference needs of their learners, and the restyling of teaching approach to adopt whichever works best for them.

While this study aimed to provide an insight the continuity of education in online setting, it does have limitations. In particular, this study did not include students' outcomes in evaluating their academic performance in e-learning, such as through interviews and surveys. Therefore, the future research can consider to address this limitation by examine how e-learning activities can be further developed by evaluating students' academic progress and understanding their responses, which should occur to meet the evolving learning needs and preferences within dynamic and interactive learning settings. Last but not least, policymakers and educators can use these finding to design targeted interventions that address specific factors influencing e-learning continuity. The potential of e-learning undeniable to bridge the digital divide and provide equitable access to educational opportunities, particularly for socioeconomically disadvantaged students.

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