

# Perceived convenience and technology acceptance of mobile applications of the pre-service teachers in learning English

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## ARTICLE INFO

DOI:10.46223/HCMCOUJS.  
soci.en.15.4.3202.2025

Received: January 21<sup>st</sup>, 2024

Revised: May 09<sup>th</sup>, 2024

Accepted: May 26<sup>th</sup>, 2024

### Keywords:

English language proficiency;  
mobile application; perceived  
convenience; pre-service  
teachers; technology  
acceptance model

## ABSTRACT

This research delves into how perceived convenience influences technology acceptance in English mobile learning applications among pre-service teachers majoring in English at a state university in the Philippines. Using an extended Technology Acceptance Model, the study utilized a survey to gauge opinions on mobile learning applications, considering factors like convenience and adoption. The results, analyzed using PLS-SEM software, highlight a strong link between perceived convenience and technology acceptance among pre-service teachers majoring in English. Demographic analysis underscores the need for personalized strategies based on age, gender, and academic levels. Overall, respondents show enthusiasm for mobile learning's adaptability in learning English. Their unanimous agreement on convenience solidifies its status as a flexible and favored approach. The positive attitudes towards ease of use and usefulness emphasize the importance of English mobile learning systems. The study's implications advocate tailored approaches for educators and policymakers, emphasizing user-friendly systems and paving the way for mobile learning apps to enhance English proficiency.

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## 1. Introduction

In recent years, there has been a notable increase in the integration of mobile technology in English language learning, particularly among pre-service teachers majoring in English. In light of these revolutionary trends, which have become integral to the academic community, pre-service teachers are increasingly driven to incorporate these technological tools into their learning and as resources for teaching and instruction. Learners in the twenty-first century have become more exposed to various technology devices, particularly mobile ones. The idea of mobile learning emerged due to educational fields' attempts to include and use rapidly developing technology to improve the learning process. This integration enables English learners to seamlessly integrate mobile technology into their learning, accessing personalized and flexible experiences tailored to their needs.

As mobile technology has gained popularity over the past few years, the number of mobile tools has increased and become more accessible to learners. Mobile applications are only one aspect of the picture for language learners in a modern classroom. Educators can incorporate fresh perspectives into their lessons (Mengorio & Dumlaog, 2019).

Over the past decade, the landscape of technological tools for English learning has significantly evolved, marked by innovative advancements and broader accessibility. One major

shift that has led to the integration of mobile technology is the Covid-19 pandemic, which accelerated the adoption of digital learning solutions, reshaping the delivery of English language education. The pandemic altered the dynamics of teaching and learning in schools. Due to the prohibition on in-person instruction, instructors and students use tools such as internet applications to participate in virtual learning (Mazulfah et al., 2022). The educational system has changed from traditional (in-person) instruction to online instruction. Learning administration must, therefore, be moved entirely online, using forms on Google, YouTube, audio, and video as examples.

Moreover, recent advancements in mobile technology have led to a significant interest in mobile learning, also known as m-learning, in the field of second language training (Kukulska-Hulme, 2009; Saran et al., 2009; Saran & Seferoğlu, 2010; Stockwell, 2010). Nowadays, there are a variety of educational tools that have progressively enhanced personalized learning experiences and engagement among language learners. This idea further delves into how these trends, influenced by unprecedented global challenges, have rapidly adopted sophisticated platforms and methods to maintain and even enhance the quality of language education amidst physical barriers.

The adoption of mobile technology in English language learning enables access to vast resources, interactive experiences, and global connections, promoting personalized learning paths (Alghamdi & Alharbi, 2021; Li & Wang, 2020). Hence, mobile learning, particularly mobile applications facilitated by mobile or wireless devices, offers numerous advantages, including increased motivation, responsibility, commitment, and improved learning outcomes (Pollara, 2011). Building upon the extended TAM framework (Davis et al., 1989), this paper aims to investigate the role of perceived convenience in technology acceptance and identify key factors mediating this relationship. This study seeks to provide insights into implementing mobile technology tools that effectively support English learning by understanding the specific needs and perceptions of pre-service teachers majoring in English.

## **2. Literature review and hypothesis development**

### **2.1. Perceived convenience**

Five significant factors are included in the study's suggested framework: Perceived Convenience (PC), Perceived Ease of Use (PEU), Perceived Usefulness (PU), Attitudes Toward Using (ATU), and Continuance Intention to Use (CIU). Perceived Convenience (PC) pertains to the ease and comfort students see using mobile technology in their English language education (Chang et al., 2012).

Hsu and Chang (2013) discussed the benefits of online learning, particularly noting perceived convenience as a significant advantage. This observation suggests that perceived convenience is a key factor influencing individuals' acceptance and usage of Information Technology (IT). Several studies have supported this notion by demonstrating the impact of convenience on consumer behavior. For instance, To et al. (2007) found that customers' intentions to shop online were influenced by convenience. Similarly, Gupta and Kim (2006) showed that convenience positively influenced the inclination to shop online. Chang et al. (2012) studied using Personal Digital Assistants (PDAs) for English learning. Their findings indicated that perceived convenience positively impacted usefulness and influenced attitudes toward PDA use. Yoon and Kim (2007) further supported these findings by reporting that perceived convenience was an important determinant of perceived usefulness and mediated the relationship between perceived ease of use and perceived usefulness. These studies collectively underscore

the significant role of perceived convenience in technology acceptance. They highlight that individuals are more likely to accept and use technology when they perceive it as convenient.

PC, PEU, and PU are precursors or predictors of Technology Acceptance (TA), the primary variable under consideration. Based on the studies of Wardana et al. (2022), the findings indicate that (1) convenience positively and significantly influences intention to use an e-wallet. (2) Convenience positively and significantly impacts the perceived usefulness of such a service. (3) The perceived ease of use positively and significantly contributes to the intention to use an e-wallet. (4) Ease of use also positively and significantly influences the perceived usefulness. (5) Additionally, the perceived usefulness significantly influences the inclination on intention to use. According to Venkatesh and Davis (2000), a relationship exists between perceived convenience and technology acceptance. As the perceived ease of using a technology rises, individuals demonstrate a greater tendency to embrace and integrate said technology. This association implies that when individuals perceive technology as user-friendly, they are more likely to view it positively and incorporate it into their daily activities or work processes. However, despite existing studies on the acceptance of mobile technology, there is a dearth of studies on the factors affecting the extent to which pre-service teachers majoring in English accept mobile technology for learning English, which can be foreseen based on their perceptions of convenience, ease of use, and usefulness.

In light of the literature presented, thus the researchers hypothesize that:

*H1: PC positively affects PU of mobile applications to learn English*

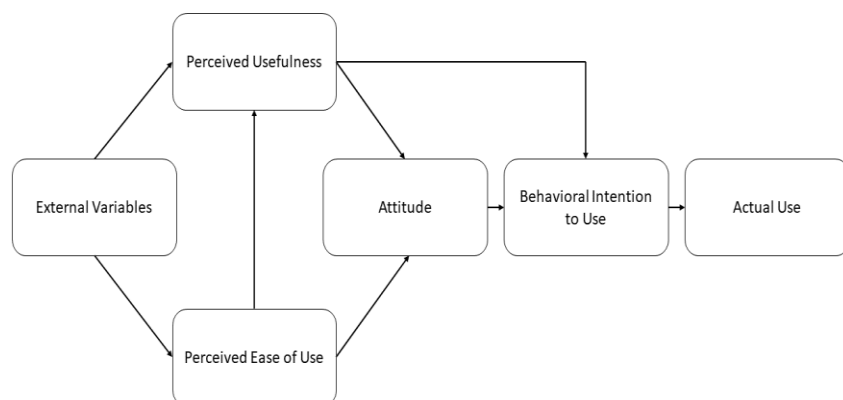
*H2: PC positively affects PEU of mobile applications to learn English*

*H3: PC positively affects ATU of mobile applications to learn English*

## **2.2. TAM model**

This study is based on the Technology Acceptance Model (TAM) foundational framework, initially introduced by Davis et al. (1989), to elucidate users' perceptions and adoption of novel technology. A pivotal aspect of this model is Perceived Convenience (PC), where individuals are more inclined to embrace and use new technology owing to its ease and convenience (Davis et al., 1989). This factor is intricately linked to Perceived Usefulness (PU), another significant element in TAM. Venkatesh et al. (2003) elaborated that perceived usefulness revolves around how much technology aids in achieving specific goals or resolving particular problems. Users who perceive technology as a valuable and convenient tool are more likely to accept and incorporate it into their practices.

Based on the study of Davis (1989), Perceived Usefulness (PU) and Perceived Ease of Use (PEU) are the main factors affecting users' propensity to accept and employ new technology. PEU refers to users' impressions of how simple it is to use technology, whereas PU relates to users' perceptions of how technology can increase their performance or productivity. On the one hand, as mentioned by Yoon and Kim (2007), the technology acceptance model considers perceived usefulness and ease of use as the main elements influencing technology adoption. Furthermore, utilizing a variety of study approaches, Davis et al. (1989) emphasized the theoretical relevance of perceived usefulness and perceived ease of use as drivers of user behavior.

**Figure 1***Technology Acceptance Model*

Note. The data are from “User acceptance of computer technology: A comparison of two theoretical models” by F. D. Davis, R. P. Bagozzi, and P. R. Warshaw, 1989, *Management Science*, 35(8), pp. 982-1003

On the other hand, as suggested by Chang et al. (2012), a computer technology system’s perceived utility and usability are critical factors in determining its acceptability. While Perceived Ease of Use (PEU) expresses the assumption that a user will not be required to put in much effort to utilize a particular system, Perceived Usefulness (PU) represents the user’s belief that a specific application system can increase job efficiency.

Yoon and Kim (2007) presented that the desire to utilize technology is influenced by attitude, and the intention, in turn, affects how the technology is used. Additionally, attitudes toward adopting technology are influenced by these two perceived factors: perceived utility and perceived ease of use (Yoon & Kim, 2007).

The model includes outside factors that impact how useful and easy to use something is, and it mediates how these external factors affect the attitude toward using it. As a result, the Technology Acceptance Model (TAM) establishes a framework for connecting outside factors - attitudes, beliefs, and the desire to utilize - with the actual application (Davis et al., 1989; Legris et al., 2003). Since TAM was first developed, academics have expanded the model, now known as e-TAM, to incorporate other characteristics that may impact technology acceptance. This study adopts the extended TAM approach, integrating perceived convenience as an additional variable. Perceived convenience here denotes users’ perceptions of mobile technology as a simple and convenient method for learning English.

The framework’s component for determining a student’s propensity to continue utilizing mobile technology for English learning is called Continuance Intention to Use (CIU). This variable evaluates the degree to which an individual plans to use mobile technology to learn English after the initial adoption stage. As a result, this construct helps assess the long-term impact of utility, accessibility, and ease of access on pre-service teachers majoring in English acceptance of technology, considering their consistent engagement and dedication to using such technology for English language learning over time.

Based on the literature cited, the researchers hypothesize that:

*H4: PEU positively affects PU of mobile applications to learn English*

*H5: PU positively affects the CIU of mobile applications to learn English*

*H6: PU positively affects ATU of mobile applications to learn English*

*H7: PEU positively affects ATU of mobile applications to learn English*

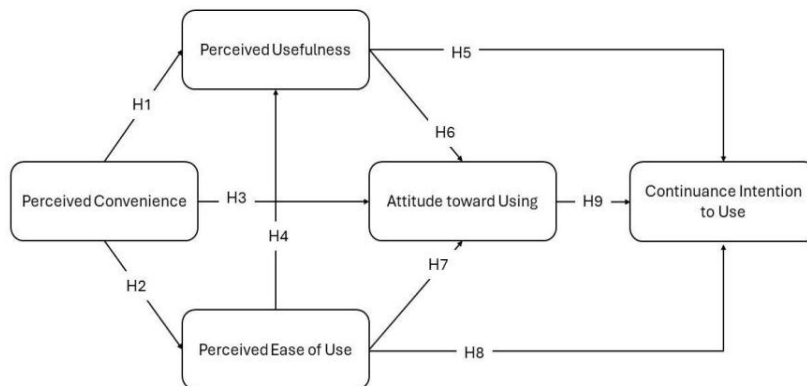
*H8: PEU positively affects CIN of mobile applications to learn English*

*H9: ATU positively affects CIN of mobile applications to learn English*

The proposed extended TAM model is shown in Figure 2.

**Figure 2**

*An eTAM Model for Mobile Applications in Learning English*



Note. The authors

### 3. Methodology

#### 3.1. Research design

This study adopts a descriptive correlational quantitative research approach to comprehensively explore the correlation between perceived convenience and the Technology Acceptance Model (TAM) within the context of mobile learning applications for English language learning. The chosen methodology involves conducting a cross-sectional survey among pre-service teachers majoring in English at a state university in the Philippines. Data collection encompasses the complete population at a specific moment, aligning with the principles of cross-sectional studies, as MSEd (2022) outlined. This approach allows for a snapshot of data, facilitating examining relationships between variables of interest and providing valuable insights into integrating technology in education.

The primary aim of this study is to delve into the intricate relationship between perceived convenience and the technology acceptance model, shedding light on how these factors influence pre-service teachers' attitudes and intentions toward utilizing mobile applications for English language learning. A key consideration lies in understanding the role of prior experiences with technology in shaping these perceptions, as Castañeda et al. (2007) suggested. Therefore, this study aims to establish correlations and contextualize these findings within the broader framework of educational technology adoption.

#### 3.2. Respondents of the study

This study's target respondents are pre-service teachers majoring in English and attending a state university in the Philippines with prior mobile learning experience. A purposive sampling method was employed to ensure the inclusion of individuals with relevant expertise in the subject matter. As Rai and Thapa (2015) noted, purposive sampling is well-suited for studies focusing on specific attributes within a small population, allowing researchers to gather in-depth insights efficiently. This approach focuses even more on individuals with particular qualities that will make them more qualified to contribute to the pertinent study (Etikan et al., 2016).

The study encompasses all pre-service teachers from the English program during the academic year 2023 - 2024, totaling 150 respondents, comprising 27 male students and 123 female students aged between 18 and 24 years and above. The main objective of this study is to gather empirical data concerning the academic experiences and performance of English primary pre-service teachers, with a particular emphasis on how they integrate technology into their studies.

**Table 1**

*Demographic Respondents of the Survey*

<b>(1) Age f (%)</b>		<b>Frequency</b>
	18 - 20	76 (50.67)
	21 - 23	73 (48.67)
	24 above	1 (0.66)
<b>(2) Gender f (%)</b>		
	Male	55 (59.8)
	Female	37 (40.2)
<b>(3) Academic level f (%)</b>		
	First-year	44 (29.33)
	Second year	56 (37.38)
	Third year	38 (25.33)
	Fourth-year	12 (8)

*Note.* Data analysis result of the research

The demographic details of the survey respondents are presented in Table 1, encompassing age, gender, and academic level. The data reveals that most respondents, constituting 50.67%, fall within the age bracket of 18 - 20 years, while the remaining respondents are aged between 21 and 30. Regarding gender distribution, females constitute 82% of the sample, whereas males account for the remaining 18%. Furthermore, the academic breakdown of the respondents indicates that 29.33% are from the first year, 37.33% from the second year, 25.33% from the third year, and 8% from the fourth year. It is noteworthy that all respondents are pre-service teachers majoring in English.

### **3.3. Data collection and analysis**

This study employs a descriptive correlational quantitative technique, utilizing a cross-sectional survey design, to investigate the correlation between perceived convenience and the technology acceptance model in English learning. A web-based survey, designed with Google Forms, was distributed to respondents via their official email addresses to gather relevant research data. Using a 5-point Likert scale across 23 statements, the survey assesses variables such as perceived convenience, ease of use, usefulness, attitude, and continuance intention.

Data gathering involves obtaining approvals, accessing student lists, and distributing surveys through official channels, with ethical considerations and confidentiality overseen by the Local Research Ethics Board of the state university. Moreover, statistical analysis utilizes MS Excel for descriptive statistics (mean, standard deviation, frequency distributions) and inferential analyses (correlation, regression) and inferential analyses, employing Partial Least Squares Structural Equation Modeling (PLS-SEM) for small sample sizes and non-normally distributed

data based on the model proposed by Chang et al. (2012).

### 3.4. Research instrument

This study adopted and modified a survey questionnaire grounded in existing research conducted by Chang et al. (2012). The questionnaire was divided into seven sections. The first part includes the demographic profile of the respondents, such as their age, gender, and academic level. The second part contains questions based on the factors affecting Perceived Convenience (PC), measured initially from the studies of Yoon and Kim (2007). The other four variables consist of three to six sections: Perceived Ease of Use (PEU), Perceived Usefulness (PU), Attitude Toward Using (ATU), and Continuance Intention to Use (CIU), first measured in the study of Davis (1989). The last section, the frequency of using the English mobile learning application, was added to the questionnaire to determine the student's usage of such mobile applications in learning English.

**Table 2**

#### *Instrument of the Study*

<b>Construct</b>	<b>Code</b>	<b>Indicator</b>	<b>Source</b>
Perceived Convenience	PC1	I can learn English at any time via a mobile learning application.	The measurement for the <i>perceived convenience</i> construct was initially based on the study of Yoon and Kim (2007) and further adopted and modified by Chang et al. (2012).
	PC2	I can learn English at any place via a mobile learning application.	
	PC3	Mobile learning is convenient for me to engage in English learning.	
	PC4	I feel that mobile learning is convenient for me to learn English.	
Perceived Ease of Use	PEU1	Learning to operate English mobile learning applications would be easy for me.	The following constructs, <i>perceived ease of use</i> , <i>perceived usefulness</i> , <i>attitude toward using</i> , and <i>continuance intention to use</i> , were also modified initially based on the study of Davis (1989) and further adopted and altered by Chang et al. (2012).
	PEU2	I find it easy to use English mobile learning applications to do what I want them to do.	
	PEU3	My interaction with English mobile learning applications would be clear and understandable.	
	PEU4	I find English mobile learning applications to be flexible to interact with.	
	PEU5	It would be easy for me to become skilled at using English mobile learning applications.	
	PEU6	I find English mobile learning applications easy to use.	
Perceived Usefulness	PU1	Using English mobile learning applications would enable me to accomplish my learning of English more quickly.	
	PU2	Using English mobile learning would improve my English performance.	
	PU3	Using English mobile learning applications would increase my learning productivity.	
	PU4	Using English mobile learning would enhance	

Construct	Code	Indicator	Source
		my English learning effectiveness.	
	PU5	Using English mobile learning would make it easier to learn English.	
	PU6	I would find English mobile learning useful in my learning of English.	
Attitude toward Using	ATU1	Learning English via mobile learning applications is a good idea.	
	ATU2	Learning English via mobile learning applications is a wise idea.	
	ATU3	Learning English via mobile learning applications is a pleasant idea.	
	ATU4	Learning English via mobile learning applications is a positive idea.	
Continuance Intention to Use	CIU1	In the next few weeks, I would like to learn English via mobile learning applications.	
	CIU2	In the next few weeks, I predict that I will learn English via mobile learning applications.	
	CIU3	In the next few weeks, I plan to learn English via mobile learning applications.	

*Note.* The authors

## 4. Results and discussion

### 4.1. Results

This section presents the results of the descriptive statistics, the measurement model assessment results, the correlation matrix of constructs, the hypothesis testing of the structural model, and the discussion of the study results.

#### 4.1.1. Frequency of using the English mobile learning application

The table below offers a comprehensive overview of mobile application usage among respondents, presented by mean values, standard deviations, and descriptive categories ranging from “Rarely” to “Always.” Notably, YouTube is prominently used and categorized as “Always,” indicating its consistent popularity. Wang and Chen (2019) emphasized how YouTube’s user-centric approach enables English learners to choose and view videos that align with their interests, thereby enhancing their motivation to learn English through the platform. As a result, the low standard deviations for both applications indicate a relatively consistent pattern of constant usage among the respondents.

On the other hand, Duolingo sees usage of applications like Google Translate fall within the “Often” category, reflecting intermediate usage patterns. According to Khotimah et al. (2021), students generally viewed using Google Translate positively. Ammade et al. (2023) also highlighted how Google Translate enhances respondents’ English vocabulary learning. Moreover, Karyuatry’s (2018) study underscored the efficacy of Grammarly as a teaching tool, emphasizing its advantages within a web-based writing environment. This approach enables students to engage in reflection, peer learning, and feedback reception and benefits from an

optimal editing space, fostering an enriched learning atmosphere (Lin, 1997). The observed standard deviations across applications suggest varying levels of consistency in their usage. Overall, this data underscores the diverse application preferences and usage patterns among the surveyed individuals, necessitating further analysis for precise conclusions or recommendations.

**Table 3**

*Frequency of Using the English Mobile Learning Application*

Mobile Applications	Mean	Standard Deviation	Verbal Description
YouTube	4.26	0.91	Always
IELTS Vocabulary	2.47	1.06	Rarely
Oxford Vocabulary	2.81	1.15	Sometimes
Merriam Webster Dictionary	4.04	0.97	Often
Urban Dictionary	2.65	1.11	Sometimes
Duolingo	1.91	0.10	Rarely
Google Translate	3.39	1.05	Often
Grammarly	3.52	1.25	Often

Note. Legend:

	Weighted Range	Verbal Descriptions
5	4.20 - 5.00	Always
4	3.40 - 4.19	Often
3	2.60 - 3.39	Sometimes
2	1.80 - 2.59	Rarely
1	1.00 - 1.79	Never

Data analysis result of the research

*4.1.2. Measurement model assessment results*

Reliability and validity assessments were pivotal in validating the research findings. Employing Cronbach's Alpha, a benchmark for consistency, the internal reliability of constructs was rigorously examined. Moreover, the Composite Reliability (CR), much like Cronbach's Alpha (Netemeyer et al., 2003), was presented. Constructs such as Attitude towards Using, Perceived Convenience, Perceived Ease of Use, Continuance Intention, and Perceived Usefulness demonstrated commendable scores of Cronbach's Alpha and composite Reliability, ranging from 0.896 to 0.921 and 0.900 to 0.924, respectively, all categorizing them within the "Excellent" range. The robustness of the study was further supported by the analysis of factor loadings, which continuously fell between 0.773 and 0.917, ensuring individual item dependability.

Turning to validity, both convergent and discriminant aspects were meticulously evaluated. Convergent validity, gauged through the Average Variance Extracted (AVE), was substantiated as all constructs surpassed the 0.5 threshold, with values ranging from 0.638 to 0.818. More importantly, the Fornell-Larcker criterion was utilized to validate discriminant validity, guaranteeing that the square root of AVE for every construct was more significant than its correlations with other constructs, thereby increasing the credibility and reliability of the research.

**Table 4**

*Measurement Model Assessment Results*

Constructs	Items	FL	Cronbach	CR	AVE
<b>ATU</b>	ATU1	0.894	0.896	0.900	0.762
	ATU2	0.859			
	ATU3	0.907			
	ATU4	0.830			
<b>CIU</b>	CIU2	0.897	0.889	0.890	0.818
	CIU2	0.900			
	CIU3	0.917			
<b>PC</b>	PC1	0.814	0.843	0.853	0.680
	PC2	0.777			
	PC3	0.842			
	PC4	0.863			
<b>PEU</b>	PEU1	0.773	0.886	0.890	0.638
	PEU2	0.813			
	PEU3	0.812			
	PEU4	0.779			
	PEU5	0.764			
	PEU6	0.846			
<b>PU</b>	PU1	0.846	0.921	0.924	0.717
	PU2	0.829			
	PU3	0.820			
	PU4	0.851			
	PU5	0.888			
	PU6	0.844			

*Note.* FL = Factor Loadings; AVE = Average Variance Extracted;  $\alpha$  = Cronbach's Alpha; CR = Composite Reliability; ATU = Attitude Toward Using; CIU = Continuance Intention to Use; PC = Perceived Convenience; PEU = Perceived Ease of Use; PU = Perceived Usefulness. Data analysis result of the research

*4.1.3. Correlation matrices of constructs*

The Fornell-Larcker criterion, introduced by Fornell and Larcker (1981), is a recognized method for confirming discriminant validity by comparing squared construct correlations with the AVE. Presented in Table 4 are the criterion results, with bolded AVE square root values for each construct and non-bolded values indicating construct correlations. Notably, all AVE square root figures (ATU = 0.873, CIU = 0.905, PC = 0.824, PEU = 0.798, PU = 0.847) surpass the inter-construct correlation values. This outcome underscores the distinctiveness of each construct, implying that they effectively capture unique attributes. These results affirm the model's validity and reliability, emphasizing the evaluation tools' precision and suitability for the structural model's analysis.

Moreover, the other measure for discriminant validity is the Heterotrait-Monotrait (HTMT) ratio of correlation, proposed by Henseler et al. (2015). HTMT values close to 1.0 indicate a lack of discriminant validity. Using the HTMT as a criterion involves comparing it to a predefined threshold. If the value of the HTMT is higher than this threshold, one can conclude

that there is a lack of discriminant validity. Kline (2023) suggests a threshold of 0.85. As presented in Table 5, the HTMT values are less than 0.85, which range from 0.643 to 0.826, which implies that it has discriminant validity.

**Table 5**

*Correlation Matrices of Constructs (Fornell and Larcker Criterion)*

	ATU	CIU	PC	PEU	PU
ATU	<b>0.873</b>				
CIU	0.707	<b>0.905</b>			
PC	0.595	0.562	<b>0.824</b>		
PEU	0.628	0.66	0.72	<b>0.798</b>	
PU	0.665	0.723	0.706	0.711	<b>0.847</b>

Note. Data analysis result of the research

**Table 6**

*Heterotrait-Monotrait (HTMT) Ratio of Correlation*

	ATU	CIU	PC	PEU	PU
ATU					
CIU	0.792				
PC	0.67	0.643			
PEU	0.691	0.733	0.826		
PU	0.726	0.797	0.792	0.775	

Note. Data analysis result of the research

#### 4.1.4. Hypothesis testing of the structural model

Structural model analysis evaluates the relationships between latent variables, focusing on path coefficients and  $R^2$  values. However, the data was verified through various assessments to test the hypotheses and conceptual models through PLS-SEM.

Collinearity assessment checks the correlation between predictor variables such that they express a linear relationship in a regression model. The research model fitness demonstrates an acceptable fit with a Standardized Root Mean square Residual (SRMR) value of 0.067 and a standard acceptable fit value of 0.08. The Normed Fit Index (NFI) value is 0.814, reflecting a moderately acceptable value with the threshold of  $NFI < 0.90$ . The NFI generates values ranging from 0 to 1. The closer the NFI is to one, the better the fit. In general, NFI values greater than 0.9 imply an excellent fit.

The Coefficient of Determination of the dependent variable construct examines how differences in one variable can be explained by the difference in a second variable when predicting the outcome. It is evaluated through the  $R^2$ , which assesses how strong the linear relationship between the variables is. Following the guidelines provided by Henseler et al. (2009) and the study by Hair et al. (2011), the values of  $R^2$  are classified as moderate (0.50), weak (0.25), or considerable (0.75). The  $R^2$  of the constructs of this research is more significant than 0.500, which indicates a moderate and acceptable coefficient.

Lastly, the effect size ( $f^2$ ) is 0.02, 0.15, and 0.35, respectively, representing the exogenous latent variable's small, medium, and significant effects (Hair et al., 2018). A value less than 0.02 indicates that exogenous constructs do not affect endogenous constructs. The  $f^2$  results show that PEU substantially affects PU ( $f^2 = 0.205$ ), and PC substantially affects PEU ( $f^2 = 1.078$ ). Furthermore, PC affects PU ( $f^2 = 0.187$ ). These results, as indicated in Table 7, are consistent with the other findings in this study.

**Table 7***R<sup>2</sup> and f<sup>2</sup> Coefficient*

	R <sup>2</sup>	f <sup>2</sup>			
		ATU	CIU	PEU	PU
ATU	0.498		0.173		
CIU	0.630				
PC		0.016		1.078	0.187
PEU	0.519	0.05	0.042		0.205
PU	0.583	0.124	0.142		

Note. Data analysis result of the research

Table 8 offers a deeper dive into the relationships, presenting coefficients, t-values, p-values, and hypothesis testing outcomes. The results from the structural model analysis are particularly revealing. Key findings indicate strong relationships between variables: notably, PC (Perceived Convenience) has a significant influence on PEU (Perceived Ease of Use) with a coefficient ( $\beta$ ) of 0.72, and PU (Perceived Usefulness) at 0.402. Furthermore, PEU impacts ATU (Attitude toward Using) at 0.251, CIU (Continuance Intention to Use) at 0.185, and PU at 0.421. Similarly, PU influences ATU at 0.388 and CIU at 0.356. These outcomes, supported by high t-values and low p-values, affirm the critical roles of PC, PEU, and PU in shaping ATU and CIU, solidifying the model's foundational constructs.

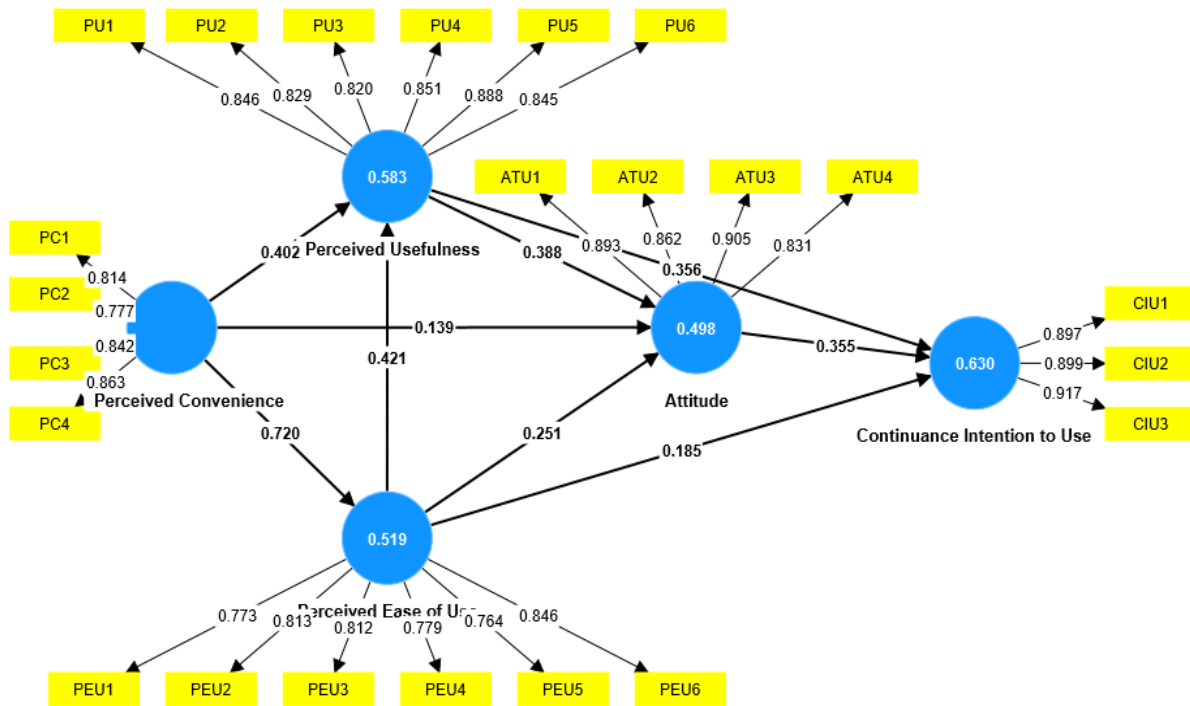
**Table 8***Hypothesis Testing of the Structural Model*

Structural model	$\beta$	T values	Results	P-values
ATU -> CIU	0.355	5.455	<b>SUPPORTED</b>	0.000
PC -> ATU	0.139	1.343	<b>NOT SUPPORTED</b>	0.179
PC -> PEU	0.720	17.909	<b>SUPPORTED</b>	0.000
PC-> PU	0.402	4.427	<b>SUPPORTED</b>	0.000
PEU -> ATU	0.251	2.497	<b>SUPPORTED</b>	0.013
PEU -> CIU	0.185	2.064	<b>SUPPORTED</b>	0.039
PEU -> PU	0.421	4.836	<b>SUPPORTED</b>	0.000
PU -> ATU	0.388	4.031	<b>SUPPORTED</b>	0.000
PU -> CIU	0.356	4.109	<b>SUPPORTED</b>	0.000

Note. Data analysis result of the research

**Figure 3**

*Structural Model of the Extended TAM (e-TAM)*



Note. Data analysis result of the research

**4.2. Discussion**

This study confirms that Perceived Convenience (PC) does not significantly influence Attitude Toward Using (ATU), highlighting the nuanced nature of user perceptions. However, Perceived Ease of Use (PEU) has a strong positive impact on ATU, indicating the critical role of a smooth user experience in shaping positive attitudes. Moreover, Perceived Usefulness (PU) emerges as a crucial determinant, fostering positive ATU and CIU. These results underscore the importance of emphasizing mobile learning applications’ usefulness and ease of use to promote favorable attitudes and Continuance Intention to Use (CIU).

*4.2.1. Effects of external variables*

In this study, one interesting finding is that perceived convenience does not significantly affect users’ attitudes toward mobile learning. This means that even if mobile learning is seen as convenient, it does not necessarily make users more likely to have a positive attitude toward it. This observation suggests that while convenience can be a factor in deciding to use technology, it may not be the key driver for positive attitudes. This result aligns with previous research suggesting that the effect of convenience on technology use can depend on the context and the specific technology (Bansah & Agyei, 2022; Chang et al., 2012; Chowdhury, 2023; Grassini et al., 2021).

However, perceived ease of use was found to have a stronger link with user attitudes. As mobile learning is seen as more straightforward, users’ attitudes become more positive, and they’re more likely to use it. This suggests that ease of use is critical in shaping positive attitudes towards mobile learning. This finding is supported by past studies that indicate that ease of use is a significant factor in adopting technology (Alyoussef, 2021; He & Li, 2023). Ultimately, a smooth and straightforward user experience can lead to a greater interest in using mobile learning applications.

*4.2.2. Effects of original TAM constructs*

The Technology Acceptance Model (TAM) includes key constructs such as perceived ease of use and usefulness, which appear to be significant in the study. Perceived ease of use directly impacts users' intentions to continue using mobile learning. This means that when users find a system easy to navigate, they are likelier to want to keep using it. This aligns with earlier research highlighting the relationship between ease of use, user attitudes, and intention to continue using a technology (Alyoussef, 2021; He & Li, 2023). It underscores that making mobile learning user-friendly can lead to higher engagement.

Similarly, perceived usefulness emerges as a crucial factor that fosters positive attitudes and encourages ongoing use of mobile learning applications. When users believe a system is helpful, they are more likely to have a positive attitude toward it and keep using it. This observation is supported by studies like those by Togaibayeva et al. (2022) and Tseng et al. (2022), indicating that usefulness is a strong motivator for continued use. This emphasizes that for mobile learning applications to be successful, they must demonstrate clear benefits to users.

The findings suggest that perceived convenience might not always significantly shape attitudes toward mobile learning. However, perceived ease of use and usefulness are critical in determining user attitudes and intentions. To ensure long-term engagement with mobile learning, developers should focus on creating applications that are easy to use and beneficial to users.

## **5. Conclusion and recommendation**

The technology acceptance model has been modified numerous times based on emerging technologies. These modifications may explain why the research community has disagreed with a single, universally accepted model (Benbasat & Barki, 2007; Stockless, 2018). According to Wu and Liu (2015), the differences could be due to inconsistencies in educational contexts, the characteristics of participants, and the focus on specific external factors in the studies. Although the study results offer reasonable support for the Technology Acceptance Model (TAM), including the extended version, the relationships between certain constructs not supported in this research (i.e., perceived convenience on attitude towards mobile applications) require additional investigation.

This study observed that among the external factors considered, perceived ease of use had the most substantial influence on attitudes toward using mobile applications. Additionally, the research highlighted the prevalent utilization of mobile learning applications like YouTube, suggesting its enduring popularity. The analysis revealed a strong and significant correlation between students' attitudes toward using YouTube and their intentions to engage with it, implying its potential efficacy in tertiary-level education. Thus, it can be inferred that integrating YouTube into formal educational settings was generally well-received, as evidenced by several studies (Fearnley & Amora, 2020; Maziriri et al., 2020).

The results of this research yield several implications, both theoretical and practical. According to Maziriri et al. (2020), it is theoretically established that two key factors - perceived ease of use and usefulness of the mobile application "YouTube" - positively and significantly affect student attitudes toward using it. Additionally, the study found that students' attitudes toward using YouTube positively and significantly impact their intention to continue using it. This suggests that perceived ease of use and perceived usefulness are critical in shaping user attitudes and continuance intentions. These insights can deepen educators' understanding of how these factors interact.

From a practical standpoint, the results suggest that education administrators should focus on creating more opportunities for students to use mobile learning applications like YouTube to enhance their English learning and other educational pursuits. This aligns with the observation that positive attitudes toward YouTube correlate with a stronger intent to use it for learning. Given these insights, the study recommends that future research may employ qualitative research design to manage other factors that could influence the results. Using this approach, researchers can generate richer data to enhance the explanatory strength of different constructs within the Technology Acceptance Model (TAM).

## ACKNOWLEDGEMENTS

The researchers would like to express their most profound gratitude to the respondents and researchers' beloved family, friends, and dearest loved ones for their encouragement, patience, and belief in their abilities, which have been a constant source of strength. Their unwavering love and support made this academic pursuit a reality, so the researchers are profoundly grateful.

## NO CONFLICT OF INTEREST STATEMENT

All authors declare that they have no conflict of interest.

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