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Research Article

Factors Affecting Students in Vietnam's Intention on Using Smartphones for Learning on the Mobile Learning Platforms

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Abstract

In the context of the COVID-19 pandemic breaking out in countries, online learning is the most effective measure that can be implemented. This study was conducted to find out the factors affecting the acceptance intention of Vietnamese learners on learning on the Mobile learning platform. Researches on the application of the model of acceptance and use of extended technology (UTAUT2) has been revised. The data is processed by using SPSS software v.26 and Smart PLS v.3.3.3 on 831 valid questionnaires surveyed from students in some Vietnam's universities. This study use PLS-SEM to test hypotheses on 831 samples. The results showed that there are six factors affect the behavioral intention on using smartphones in learning on M-learning, including: the efficiency expectation, the effort expectation, the enjoyment motivation, the service quality and the habit. At the same time, the result also shows that the factors affecting the behavior of using smartphones are habits, favorable conditions, and the strongest influencing factor of behavioral intention. The study also provides suggestions for governance to help educational managers and business units in the education sector improve the service quality to attract, satisfy customers to enhance competitive advantage.

Keywords: UTAUT2, smartphone, Mobile learning, learners, universities in Vietnam

1. Introduction

The technology trend applied to learning in universities has been being widely implemented in the early 20th century (Kirkwood & Price, 2005). Online learning is being promoted by universities to meet the increasingly diverse learning needs of all learners (Kirkwood & Price, 2005). In the current 4.0 era, many people tend to choose online learning because of its convenience, flexibility in time and place (Chen & Tseng, 2012). Mobile learning is becoming increasingly popular in educational

organizations (Cheon et al, 2012). Under the ability to meet a variety of teaching functions and references; online learning brings advantages for m-learning in the period of the new technology era (Cheon et al, 2012). According to statistics of Global Market Insights, the mobile learning market size has surpassed 20 billion USD of 2019 and is ready to grow at a rate of 13% from 2020 to 2026. The Covid pandemic has made the demand of mobile learning solutions increase significantly. In developing countries, mobile technology has been adopted at a higher rate than personal computers, it perhaps because smartphone devices are better priced and more functional than personal computers. (Zambrano et al., 2012). Vietnam is the country with the 6th largest number of internet users in Asia and ranks at 12th in the world with 64 million people in 2018 (We Are Social, 2018). Therefore, the potentiality for mobile learning services is huge.

Nowadays, along with the development of technology and internet, mobile devices are not simply a common search tool for communication and information, but they have been becoming a method providing many convenient functions such as entertainment, shopping, and learning (Crumpton and Burke 2018; Lavidas et al. 2019). One research also points out cell phones/smartphones are the most frequently used by students (Crumpton and Burke 2018; Lavidas et al. 2019). It means that students are the largest groups using mobile devices. Currently, in the world in general and Vietnam in particular, smartphones are an indispensable learning support tool for students. According to smartphone users report in 2019 written by Adsota's 2019, Vietnam is in the top 15 countries with the highest number of smartphone users in the world, with 43.7 million users, equivalent to 44. 9% of the total population; that has proven smartphones has marked an important development step between brands and users. According to the survey results by Hung et al (2014) on the use of mobile devices, 50% of students have owned a smartphone and around 80% among of them using mobiles devices for learning. Smartphones are not only a device for communication, entertainment, and self-expression, but also an effective learning support tool. The rational use of smartphones will help students' learning results achieve better results.

Before the Covid-19 epidemic happens, Vietnamese Universities started to host lectors through E-learning training quite early, even though E-learning was used in the form of support or combination for traditional learnings. (Le et al, 2018). Schools that have implemented E-learning programs mainly thought form of piloting and online training on mobile devices is still limited (Tam, 2017; Thai, 2017; Linh et al, 2017; Thai, 2017). In recent years, a number of universities have strongly implemented online trainings, especially on mobile devices when these universities have invested a lot on modern online education system like HCMC Open University, HCMC Technology and Education... During the Covid-19 epidemic, about 50% of Vietnamese universities have implemented online trainings at various levels in order to limit the interruption of school programs. Learners use various online applications from the self-effort of educational institutions or the companionship high social responsibility of between the domestic and foreign online service providers. Many schools are making online learning more adaptable, helping lectures become more user-friendly and closer to learners. According to Ha Anh (2020), a quick survey on online learning conducted with nearly 4,000 students at a university in Vietnam shows that students using smartphones to learn online help themselves improve their learning skills of information technology and enhance the proactivity at learning. However, the survey results also show some limitations of online learning via smartphones, such as: transmission lines still meet some errors, digital resources are not diverse, teaching methods of lecturers are not suitable with online teaching, students' awareness is still limited. Therefore, it is necessary to improve the teaching method and content of online learning in Vietnam in order to improve the effectiveness of online teaching and learning.

Although there have been many studies showings the factors affecting the intention as well as the decision of using E-learning services, the M-learning model is considered new in the online learning system. At the same time, there are no specific studies on the intention and behavior of using M-learning in Vietnam. Therefore, this study was conducted to find out the factors that play an important role in increasing the intention and decision to use the M-learning system in Vietnam.

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2. Literature Review and Hypothesis

2.1 Mobile learning (M-learning)

M-learning has many different definitions and expressions depending on different fields. M-learning is a new phase in the development of e-learning and distance teaching (Wang et al., 2009). It refers those learnings through wireless mobile devices such as smartphones, tablets, PDAs, etc. can be moved with the learner and be taken in any places at any time (Wang et al., 2009). Martin & Ertzberger (2013) defined that M-learning is a method for learners to access information anytime and anywhere even they can use mobile technology to participate in other activities at the same time of studying. According to Winters, (2007), M-learning is described as using mobile technologies to facilitate learning. Freitas & Schlemmer (2013) concurred with this viewpoint, stating that the impression of mobility was the most crucial component. The utilization of M-learning applications is one of the most common forms of M-learning in education. Freitas & Schlemmer, 2013). An application is a short program that can be downloaded to a smartphone or tablet and accessed through a wireless network. Apps will enable access to instructional resources, engaging activities, and the ability to share among students.

2.2 Smartphone

A smartphone is not only a simplistic mobile phone, but it also can receive the email, send an email, connect internet, allow extra features like a camera and large data storage capacity (Pitt et al., 2011). It is not simply a phone; moreover, it has diverse data storage capacity and high-speed data transmission. Smartphones have transferred data into the other users at any time and independently from time and space (Leyland et al. 2010). Smartphone can also interpret tactile information via touch screens, include navigation systems like GPS, and have spawned a marketplace for downloaded mobile apps (Pitt et al., 2011). As stated by Cassavoy (2012): "A smartphone can be clarified as a device that allows the user to make calls and be able to perform certain features that were not available in the past unless using a computer or a personal digital assistant (PDA) such as sending and receiving email and editing documents.

2.3 The Unified Theory of Acceptance and Use of Technology – UTAUT2

Venkatesh et al., 2012 extended the theory of acceptance and use of technology. The researcher has developed a complementary approach for the original model named UTAUT2 model. UTAUT2 is integrated with elements of beneficiary motivation (Hedonic motivation – HM), price value (Price value – PV) and habit (Habit – HB) into the original UTAUT model. In addition, the model still retained demographic variables such as age, gender, experience and removed the voluntary factor used in the original UTAUT model. The goal of the UTAUT2 model is to predict the behavior of users to accept and use technology. Based on the UTAUT2 model, researchers can apply the original model or add some new variables to match with the research characteristics.

Table 1: Some researches on M-learning basing on UTAUT2

No	Author	Topics
1	Bharati et al., 2018	The model of UTAUT2 is adjusted for Indian Students's M-Learning.
2	Wajid Hussain Rizvi (2018)	Factors determines the learning acceptance on mobile of students in Pakistan.
3	Arain et al., 2019	Expanding UTAUT2 towards on the acceptance of M-learning in the Pakistani University Educational Context.
4	Nawaz et al., 2020	Acceptance of M-learning by learners in Sri Lanka: an approach to the UTAUT2 model

No	Author	Topics
5	Kang et al., 2015	Investigating the determinants of learners' acceptance of M-learning in Korea using UTAUT2
6	Nikolopoulou et al., 2020	M-learning acceptance of students in studying: an investigation applied with the UTAUT2 model
7	Thanh Nguyen Duy et al., 2014	The acceptance and use of cloud-based online training

2.4 The hypotheses

Performance expectations (PE) are the feelings status when users gain benefits from using technology while performing other activities" (Venkatesh et al., 2012). They also show that performance expectations in prior models were the strongest predictors of behavioral intention of using Information Technology. A student wants smartphone gadgets to boost not only his or her academic results, but also his or her general educational achievement (Yang et al., 2010). Therefore, the hypothesis is presented:

H1 (+): PE has positive effect on behavioral intention of learners in using smartphone in study on M-learning system.

Venkatesh et al. (2003) defined effort expectation (EE) as the level which individuals think they will have when using an information system in an easy way. The easy use of the designed information system is one of the important factors in the information technology acceptance (Wu et al., 2008). Moreover; EE plays a larger role in evaluating smartphones as learning tools, as they are intuitive with easy-to-use touchscreen interfaces, smart sensors, gesture controls, all of which draw attention to the ease of access and interaction for all users at all ages due to its popularity (Wang et al., 2014). Therefore, the hypothesis is presented:

H2 (+):EE has positive effect on behavioral intention of learners in using smartphone in study on M-learning system.

According to Venkatesh et al., 2003, Social influence (SI) reflects a person's perception in relation with other important persons whose strong belief in their use of M-learning technology" (Venkatesh et al., 2003). Social influence refers the levels which learners feel that fluential others (e.g. friends, colleagues, etc.) believe they should use cell phones in learning. Therefore, the hypothesis is presented:

H3(+):SI has positive effect on behavioral intention of learners in using smartphone in study on M-learning system.

Facilitation (FC) is the degree which an individual believes that an organizational and technical infrastructure exists to support the use of the system (Venkatesh et al., 2003). According to Will & Allan (2011), there are many sorts of problems associated with using an online training system such as hardware, software and technical support. FC is an important factor affecting on behavioral intention to use M-learning in the topic of modeling learners' readiness to apply M-learning in universities: an experimental study in Jordan (Al-Adwan et al., 2018). Therefore, the hypothesis is presented:

H4(+) FC has a positive effect on behavioral intention of learners in using smartphone in study on M-learning system.

H5(+):FC has a positive impact on actual smartphone use in their research on the M-learning system.

Hedonic motivation (HM) is defined as pleasure or interest derived from the use of technology" (Venkatesh et al., 2012). It means that HM is considered as intrinsic motivation such as pleasure or enjoyment in using a technology for its own sake and it has been known as a determining factor in the acceptance and use of technology. Through many sensory systems such as content design, efficiency, and personalisation, phenomenal technology designers can give users with a wide range of demands with delightful experiences. The usage of technology, whether direct or indirect, has been linked to intrinsically motivated (Lee et al., 2005). Therefore, the hypothesis is presented:

H6(+) HM has a positive effect on behavioral intention of learners in using smartphone in study on M-learning system.

Most definitions of service quality (SQ) have focused on the perception of customers and their satisfaction with the services provided. According to Parasuraman et al., 1988, users'expectations for service quality was defined that one supplier should provide services what users need not what suppliers have. In other words, one research is implemented by Zeithaml, 1988 defined service quality reflected the user's assessment on the superiority of the service. This research is agreed by Lee, 2010, the researcher pointed out that students' perception of the quality of online support services can be considered as a factor influencing their behavioral intention of online learning. At the same opinion, Almarashdeh et al., (2010) stated that service quality was an important factor determining the success of the design for learning management system. As the result, Mohammadi (2015) showed that service quality affected learners' satisfaction and intention, making learners enhance ability to use E-learning system. Hypothetical research:

H7(+) SQ has a positive effect on behavioral intention of learners in using smartphone in study on M-learning system.

Habits (HB) are repetitive behaviors with high frequency (Venkatesh et al., 2012). Habits were norms which an individual believes the behavior is automatic, formed by learning process, and influenced by technology use (Venkatesh et al. 2012). Research hypothesis:

H8 (+): HB has a positive effect on behavioral intention of learners in using smartphone on M-learning system.

H9 (+): HB has a positive impact on the behavior of using M-learning system.

Behavioral intention (BI) is defined as the way people draw thought-based conclusions about performing or not performing a particular behavior (Venkatesh et al., 2003). Behavioral intention is a significant factor determining the practical use of technology in different intention models (Venkatesh et al. 2003, 2012). Intention shows that motivational factors influence on the behavior (Ruiz et al., 2010). Research hypothesis:

H10(+): Behavioral intention has a positive influence on using the M-learning system

Demographic factors:

Gender: The impact of gender factor on the relationship of variables in the present study was adopted from the study of Venkatesh et al (2012). Research hypothesis:

H11(+): Gender moderates the effects of PE, EE, SI, FC, HM, PV and HB on BI in learning through Smartphones.
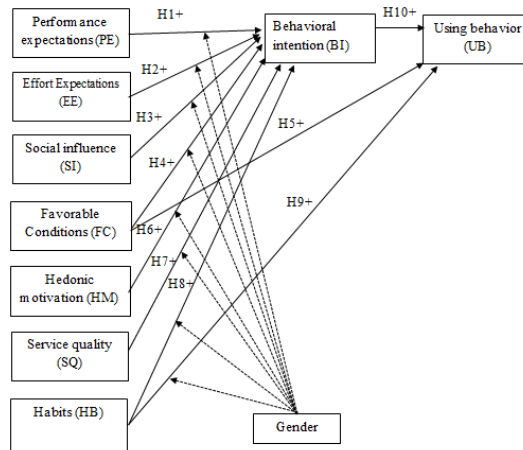

Figure 1: Research Model

3. Research Method

3.1 Research Design

The scale is referred from Nikolopoulou et al. (2020), Venkatesh et al (2012), Almaiah et al., (2018). From this original scale, the scale in this research is adjusted to suit the cultural context in Vietnam. Research data is collected through questionnaires consisting of 2 parts: 1st part includes personal information such as full name, gender, education level, ability to use smart phones; 2nd part is a questionnaire rated on a Likert-type scaling from 1-5. The survey was built using Google Forms and sent via email. After collecting data, it was screened and obtained 831 valid questionnaires, then data keeps being cleaned and analyzed by using SPSS software version 26 and Smart PLS version 3.3.3.

3.2 Data Analysis

After entering the data into SmartPLS software, factors will check the reliability of the scale. Cronbach's alpha coefficient was used to examine the scale reliability of the constructs in the study model, which had to be greater than 0.6 (Hair et al., 2006) and the item-total correlation had to be greater than 0.3 (Nunally & Burstein, 1994). Convergence and discriminant validity are assessed using confirmatory factor analysis (CFA) to determine the appropriateness of the study scales. At the 5% significant level, PLS-SEM was used to determine the effects of the factors on the intention to employ M-learning. Convergent validity was defined as a construct with all factor loadings of items more than 0.5 and the squared root of the variance greater than the correlation coefficient.

4. Results

4.1 Descriptive statistics

According to the survey results, the female gender accounts for a higher proportion of 520 people, accounting for 63%. The male gender accounts for a lower proportion of 311 people, accounting for 37%. Regarding age, basing on the survey results, the youngest person is 18 years old and the oldest is 49 years old, the age group from 18 to 20 accounts for the highest proportion of 582 people, accounting for 70%; the group from under 20 to 25 years old, accounting for 26%; There are 34 people at over 25 years old, accounting for 4%. Regarding education level; the number of people studying at university level is 800 people accounts for 96% and the number of people studying at postgraduate level (master's degree) is 31 people accounts for 4%. Regarding the ability to use smartphones; the number of people with weak ability to use smartphones is 6 people, accounting for 0.7%, the poor level is 16 people, accounting for 1.9%, the average level is 367 people, accounting for 44.2%, the good is 395 people, accounting for 47.5% and the number of people at very good level is 47, accounting for 5.7%.

4.2 Evaluation of the measurement model

4.2.1 Reliability and validity of the scale

In Table 2, the factor loading values of the indexes rank from 0.753 to 0.943 and the values of the squared load coefficients of the indexes rank from 0.567 to 0.889, they are both higher than 0.4. In addition, in this study, when analyzing internal consistency reliability, the study used composite reliability (CR). Analytical results show that the composite reliability BI = 0.943, EE = 0.937, FC = 0.943, HB = 0.931, HM = 0.962, PE = 0.927, SI = 0.906, SQ = 0.955, UB = 0.940. All composite reliability values are greater than 0.8 (minimum value is 0.906). Therefore, the scale has internal consistent reliability. According to the results of the table above, the AVE values of the above structures are: BI = 0.805, EE = 0.787, FC = 0.768, HB = 0.772, HM = 0.836, PE = 0.762, SI = 0.708, SQ = 0.842, UB = 0.798. All variables have an AVE higher than 0.5 (the lowest AVE value is 0.708).

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Table 2: Summary results of factors loading in the PLS-SEM model after analysis

Factors	Variable Code	Comments	Factor loading	Reliability index
		Behavioral (α = 0.919, CR = 0.943, AVE = 0.805)		
BI	BI1	I want to use a smartphone immediately to study on M-learning platform	0.851	0.724
	BI2	I intend to use a smartphone in the future for my study on M-learning platform	0.896	0.802
	BI3	I will keep trying to use a smartphone for my study on M-learning platform.	0.909	0.826
	BI4	I plan to keep frequently using a smartphone for my study on M-learning platform.	0.931	0.866
		Effort expectations (α = 0.910, CR = 0.937, AVE = 0.787)		
EE	EE1	It is easy for me to learn how to use a smartphone for study on M-learning platform.	0.873	0.762
	EE2	It is clear and easy for me to understand interactions on smartphones while learning on the M-learning platform.	0.878	0.77
	EE3	It is easy for me to use a smartphone for study on M-learning platform	0.901	0.811
	EE4	I am professional on using a smartphone for study on M-learning platform.	0.896	0.802
		Favorable Conditions (α= 0.925, CR = 0.943, AVE = 0.768)		
FC	FC1	I have necessary resources to use a smartphone for study on the M-learning platform.	0.862	0.743
	FC2	I have necessary knowledge to use a smartphone for study on M-learning platform.	0.891	0.793
	FC3	The learning apps installed on my smartphone are compatible with other technologies I use.	0.877	0.769
	FC4	I can ask others for help if I have trouble using my smartphone to study on the M-learning platform.	0.872	0.76
	FC5	The school creates favorable conditions for me to use smartphones to study on M-learning platform	0.881	0.776
		Habits (α = 0.902, CR = 0.931, AVE = 0.772)		
HB	HB1	Using smartphones to study on the M-learning platform has become my habit.	0.888	0.788
	HB2	I am passionate about using my smartphone to study on the M-learning platform.	0.866	0.749
	HB3	I am required to use a smartphone to study on the M-learning platform.	0.871	0.758
	HB4	Using smartphones becomes natural to me when studying on M-learning platform.	0.89	0.792
		Hedonic motivation (α = 0.951, CR = 0.962, AVE = 0.836)		
HM	HM1	Using a smartphone for study on M-learning platform is enjoyable	0.907	0.822
	HM2	Using a smartphone for study on M-learning platform brings many interesting experiences.	0.884	0.781
	HM3	Using a smartphone for study on the M-learning platform brings me pleasure.	0.909	0.826
	HM4	Using smartphones for study on the M-learning platform is always exciting for me	0.943	0.889
	HM5	Using mobile phones for study on M-learning platform always gives me stimulation in learning.	0.928	0.861
		Performance expectations (α = 0.896, CR = 0.927, AVE = 0.762)		
PE	PE1	Using my smartphone is helpful for my study on the M-learning platform	0.889	0.79
	PE2	Using a smartphone increases my chances of achieving the important things while learning on the M-learning platform	0.876	0.767
	PE3	Using a smartphone helps me to complete my various learning-related activities faster on the M-learning platform	0.897	0.804
	PE4	Using my smartphone to study on the M-learning platform helps me increase my productivity in learning	0.828	0.685
		Social influence (α = 0.861, CR = 0.906, AVE = 0.708)		
SI	SI1	My classmates advised me to use smartphones for studying on the M-learning platform.	0.869	0.755
	SI2	The teachers advised me to use smartphones for studying on the M-learning platform.	0.887	0.786
	SI3	My family and relatives advised me to use smartphones for studying on the M-learning platform.	0.851	0.724
	SI4	I use my smartphone for study on the M-learning platform to prove myself	0.753	0.567
		Service quality (α= 0.938, CR = 0.955, AVE = 0.842)		
SQ	SQ1	Application for M-learning provides the study at anywhere.	0.927	0.859
	SQ2	Application for M-learning provides the study at any time.	0.931	0.866
	SQ3	Application for M-learning provides quick service.	0.914	0.835
	SQ4	The technical staff of the M-learning application is ready to assist learners at any time.	0.899	0.808
		Using behavior (α= 0.915, CR = 0.940, AVE = 0.798)		
UB	UB1	I frequently use my smartphone in learning on the M-learning platform	0.901	0.811
	UB2	I am currently using my smartphone as a learning aid on the M-learning platform	0.895	0.801
	UB3	I spend a lot of time using my smartphone for studying on the M-learning platform	0.908	0.824
	UB4	Using a smartphone is one plesant experience.	0.868	0.753

The average variance extracted (AVE) of above 0.5 in each structure shows a satisfactory convergence value (Fornell and Larcker 1981). The application of the Fornell-Larcker criterion (Fornell and Larcker 1981) showed satisfactory discriminant value (Table 3).

Table 3: Discriminant (Fornell – Larker critierion)

	BI	EE	FC	HB	HM	PE	SI	SQ	UB
BI	**0.897**								
EE	0.712	**0.887**							
FC	0.742	0.77	**0.877**						
HB	0.803	0.645	0.703	**0.879**					

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	BI	EE	FC	HB	HM	PE	SI	SQ	UB
HM	0.799	0.728	0.755	0.821	**0.914**				
PE	0.761	0.753	0.766	0.766	0.792	**0.873**			
SI	0.73	0.781	0.755	0.701	0.765	0.844	**0.842**		
SQ	0.753	0.712	0.806	0.675	0.721	0.69	0.708	**0.918**	
UB	0.866	0.724	0.745	0.783	0.771	0.724	0.715	0.75	**0.893**

4.2.2 Results of Research Hypothesis

VIF values of the observed variables from 2.401 to 4.8 are all less than 5, showing that the latent variables do not have multicollinearity. SRMR index is 0.054 less than 0.08, means that the actual research model is suitable.

From Table 4, it can be seen that the research model has statistically relationships, except that the FC -> BI relationship is not significant due to the coefficient $p > 0.05$ ($p = 0.650$); SI -> BI is also not significant because the coefficient $p > 0.05$ ($p = 0.558$). R^2 of BI = 0.759, UB = 0.786 and adjusted R^2 of BI = 0.757, UB = 0.785 are all greater than 0.67, all proved that the model is strongly explained. Q^2 of BI = 0.602 > 0.5 and Q^2 of UB = 0.620, hence, the model containing BI and UB variables has reached the high predictive accuracy. $q^2_{FC-UB} = 0.029$, $q^2_{HB-BI} = 0.06$, $q^2_{HB-UB} = 0.024$, $q^2_{SQ-BI} = 0.029$ rank in the range [0.02; 0.15], show that the predictive efficiency of FC to UB, HB to BI, HB to UB and SQ to BI are all at average.

Table 4: Results of testing Research Hypothesis

Hypotheses	Path	β	Std.β	t-value	p-value	VIF	f²	q²	Conclusion
H1	PE -> BI	0.099	0.048	2.063	0.039	4.822	0.008	0.003	Supported
H2	EE -> BI	0.093	0.038	2.431	0.015	3.369	0.011	0.005	Supported
H3	SI -> BI	0.025	0.042	0.588	0.556	4.439	0.001	0.000	*Rejected*
H4	FC -> BI	0.023	0.05	0.467	0.640	4.219	0.001	0.000	*Rejected*
H5	FC -> UB	0.180	0.036	4.968	0.000	2.401	0.063	0.029	Supported
H6	HM -> BI	0.180	0.044	4.097	0.000	4.442	0.03	0.013	Supported
H7	SQ -> BI	0.228	0.05	4.607	0.000	3.258	0.066	0.030	Supported
H8	HB -> BI	0.331	0.04	8.246	0.000	3.532	0.128	0.060	Supported
H9	HB -> UB	0.193	0.037	5.181	0.000	3.029	0.058	0.024	Supported
H10	BI -> UB	0.578	0.048	12.065	0.000	3.411	0.456		Supported
SRMR	SRMR = 0.054								
R²	R²BI = 0.759; R²UB = 0.786								
Q²	Q²BI = 0.602; Q²UB = 0.620								

4.3 Evaluating the role of the moderate Gender Variable

Gender moderated the relationship from HB to BI with $p = 0.020 < 0.05$, moderated the relationship from HB to UB with $p = 0.049 < 0.05$ and from PE to BI with $p = 0.044 < 0.05$. Hypothesis Gender affects the relationship between EE and BI.

Table 6: The hypothesis testing result with gender as moderate variable

Path	β	Std.β	t-value	p-value	Conclusion
GEN_EE -> BI	-0.010	0.041	0.238	0.812	*Rejected*
GEN_FC -> BI	-0.025	0.047	0.535	0.593	*Rejected*
GEN_HB1 -> BI	0.102	0.044	2.329	0.020	Supported
GEN_HB2 -> UB	0.034	0.017	1.972	0.049	Supported
GEN_HM -> BI	0.033	0.049	0.676	0.499	*Rejected*

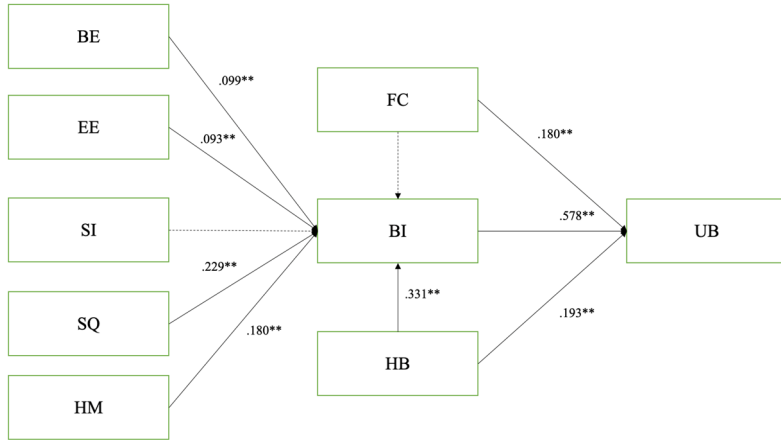| Path	β	Std.β	t-value	p-value	Conclusion
GEN_PE -> BI	-0.098	0.049	2.017	0.044	Supported
GEN_SI -> BI	0.038	0.043	0.873	0.383	*Rejected*
GEN_SQ -> BI	-0.018	0.047	0.381	0.703	*Rejected*

Figure 2: The result SEM with gender as a moderator variable.

5. Discussion

Among the analyzed factors, habit factor (HB) has the strongest influence on behavioral intention (BI) with β = 0.331, p = 0.000 < 0.05 and HB affects using behavior (UB) of learners with β = 0.193, p = 0.000 < 0.05 when using M-learning smartphones. This result is also consistent with the study of Nikolopoulou et al. (2020), Arain et al (2019) and the study of Nguyen Duy Thanh et al (2014). This result proves that the higher habits of smartphone on M-learning platform is, the higher the technology adoption rate will be. In other words, when using smartphones increases, the automation in the use of smartphones for study and research purpose is also higher. The results also show that gender factor also has a moderate role in the relationship between HB and BI with β = 0.102, p = 0.020 < 0.05 and the relationship between HB and UB with β = 0.034, p = 0.049.

Besides, the factor of service quality (SQ) has a positive impact on behavioral intention with β = 0.228, p = 0.000 < 0.05. As the result, SQ is an important factor to improve learners' behavioral intentions in using smartphones for study; learners will be ready to apply the M-learning system when the high-quality services are provided and brings benefits to their learning. This research result is also consistent with the study of Ahmad et al (2013), Arain et al (2019), Bharati et al (2018).

The factor of Hedonic motivation (HM), performance expectations (PE), and effort expectation (EE) also effect on the behavioral intention of using smartphones on M-learning system. The above research results reinforce previous studies by Arain et al (2019), Bharati et al (2018), Nikolopoulou et al (2020), and Nguyen Duy Thanh et al (2014). Research results show that any technology which enriches the learner's experience will be used by themselves to achieve high academic performance. According to Wang et al., (2009) students think that the M-learning system will be easy to use and they will not need much instruction on how to use it. This is also the criterion for M-learning designers refer to make the system become easy to use and user-friendly.

The factors of behavioral intention (BI) and favorable condition (FC) have positive affect on using behavior (UB), of which BI has the strongest impact on UB; the higher BI is, the higher the use of smartphones for study on the M-learning system reaches. This result is shown by the relationship between these two factors with a very high β coefficient of 0.578, p = 0.000... This consequence is

compatible with studies by Nikolopoulou et al. (2020) and Nguyen Duy Thanh et al (2014). In addition, the analysis results show that the favorable condition factor (FC) has impacted on UB with β. = 0.180, p = 0.000 < 0.05. If a university can create favorable conditions for learners to study on M-learning by smartphone, learners will be ready to use it and the above relationship is also supported by Nikolopoulou et al (2020).

According to the research's result, the Social Influence (SI) factor was evaluated not to impact on the behavioral intention. This result is different from previous studies implemented by Nikolopoulou et al. (2020), Nguyen Duy Thanh et al (2014). However, the results are consistent with the results of Arain et al (2019), Nawaz et al. (2020), Bharati et al (2018) when it assumed that learners made their own decisions and were not influenced by others. In addition, during the time of the Covid-19 epidemic, universities used online teaching software from 3rd parties (service providers) such as Microsoft Term, Google Meet, Zoom applications... All of apps are easily installed on smartphones without influence from others. online learning system, maximum technical support, ...so it is easy for learners to accept and use smartphones to study.

Besides, the favorable condition factor (FC) is also not supported in the study to affect the intention to use (BI). This result is consistent with the study of Nawaz et al. (2020) and Nikolopoulou et al. (2020). But through the above analysis, FC has an impact on intention to use (UB). This shows that during the Covid-19 pandemic, for learners to use smartphones to study online easily, universities have carefully instructed how to use the online learning system.

6. Conclusions

This study analyzes the factors affecting the behavioral intention of using smartphones for learning in a developing country like Vietnam. The authors have applied the UTAUT2 model to analyze the factors affecting smartphone acceptance for learning. In the UTAUT2 model, the authors have replaced the price factor with the service quality factor to be consistent with the study. The research results have shown five factors that affect and explain the behavioral intention to use smartphones in learning on M-learning about 75% ($R2 = 0.75$), including performance expectation, effort expectations, hedonic motivation, service quality, habits and favorable conditions. At the same time, the results also show that the factors affecting the behavior of using smartphones are habits, favorable conditions, are the strongest factor affecting on the behavioral intention, and the above factors explain BI about 78% ($R^2 = 0.78$).

7. Implications

From the research results, the authors give some implications to help improve the behavioral intention of using M-learning in Vietnam.

Firstly, building habits of using smartphones to study on the M-learning system for learners.

Of the factors affecting on behavioral intention of using smartphones on M-learning, the factor of habit has the strongest influence on behavioral intention. During the Covid-19 epidemic, learners are required to participate in learning on online platforms, which helps learners form online learning habits, especially the use of smartphones in learning. Currently, the use of smartphones for study is no longer strange. Learners have gradually become accustomed to using smartphones in learning on the M-learning platform. In order to build up the habit of using smartphones, universities must deploy projects right from the moment students entered the new semester, and the universities must have compulsory regulations and encouraging policy for learners to participate in.

Secondly, making favorable conditions and bringing learners ease and convenience when they use smartphones in learning on the M-learning platform

The factor of favorable conditions has a positive impact on the behavioral intention to use smartphones on the M-learning platform. Through the survey results, schools are suggested to create favorable conditions for students to use smartphones for studying on mobile; learning apps installed

on their smartphones are compatible with other technologies they are using and should be supported if learners meet difficulties while studying. Apps for learning on smartphones should be optimized with easy-to-use, user-friendly functions; at the same time, apps should be ensured to provide full and diverse course content and materials to improve learner performance. Moreover; an easy-to-use modern look is also concerned to create a user-friendly experience that ensures online course becomes more familiar to study.

In addition, education institutions should regularly organize seminars, talks, advertisements and tutorials to provide information to educate learners about the potential benefits of using mobile phones; basic trainings for in-depth skills on using the M-learning system are should be launched right from the moment students enter the school; The author also suggest the educational organizations should cooperate with service providers to provide learners good devices such as smartphones, sim cards connecting to the Internet, etc. at low prices so that learners can easily participate in the M-learning system.

Thirdly: Enhancing the Service Quality.

The service quality helps to connectt learners and educational institutions together. As a result, learners believe that the M-learning application provides learning services for them at anywhere, at any time. Fast and ready to assist service make learners feel active in learning whenever they have questions. Therefore, the M-learning system must have availability so that learners can use smartphones to access the M-learning system from anywhere and at any time. , the call center or email feedback needs to be paid attention to ensure the system works stably and quickly, supports learners 24/7. Regular trainings should be organized for support staff in order to make them become more professional, friendly.

Fourthly, Improving the performance of the M-learning system

The research results show that the performance and effort expectations have a relatively low influence on the behavioral intention to use smartphones for learning on the M-learning platform, in which the learners believe that the their academic performance is not high, not fit to expectations when using smartphones to study on the M-learning platform. Educational institutions need to focus on improving the performance of the M-learning system, such as: Equipping an M-learning system to integrates modern and open technologies in order to maximum support for mobile devices, especially mobile devices like smartphones; infrastructure, transmission lines should be constantly upgraded, the system must be highly secured and synchronous. The courses on the system need designing on quality criteria, lively lecture system, diverse learning resources to meet the needs of learners to improve the efficiency. Lecturers have to build lessons that are suitable for learning on the M-learning system such as: providing some interesting elements in their teaching activities through games, virtual reality, etc. Many interesting experiences will make learners feel excited and interested when using smartphones to study on the M-learning system. Developing policies, regulations and favorable mechanisms to help learners feel most comfortable when participating in the M-learning system.

Finally, enhancing the value of social influence

Learners often start to use a certain learning system after asking for experiences from familiar people such as classmates or previous learners. Instead of focusing on instructing all students, educational institutions can select learners who have capability and well understandings about the system to guide and train other learners and thereby replicate this method to save costs and effort for educational institutions.

Instructors can promote student to use M-learning by increasing teaching on the M-learning system. Therefore, trainers need to be familiar with new technology and willing to participate in implementation plans. Instructors are required to have a positive perception of the usefulness of the mobile learning system to train learners. It is necessary to motivate university lecturers, raise their awareness of M-learning and provide them with training courses to keep them updated with new knowledge and technologies in M-learning trainings. It is especially important to strengthen students' awareness and proactivity in using smartphones in learning. This can change learners' intentions towards accepting M-learning positively.

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