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The Predictors of Habitual Behavior in Using Mobile Phone among University Students

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***Abstract*— The use of technology in academic activities, particularly in higher education institutions is one thing in common and undeniable. Entering the era of information technology without borders, the use of technology such as computers, laptops, tablets, mobile phones and so on are seen as essential roles to assist educational activities. Therefore, the utilization has become the norm among instructors and students in higher education institutions. Through previous studies, the terms of norms often referred to habitual behavior or automatically behavior. This study focused on three of independent variables from UTAUT's model (performance expectancy, effort expectancy and social influences) to predict students' habitual behavior in higher education in the use of mobile phone. This study involved 393 of undergraduates' student and was conducted entirely in Universiti Putra Malaysia (UPM), Serdang. The results of data analysis revealed all the independent variables have significant effect on habitual behavior.**

***Index Terms*— Performance expectancy, effort expectancy, social influences, habitual behavior**

I. INTRODUCTION

Mobile phones are one of the categories of mobile device that are more flexible brought by people nowadays compared to other technological devices. It can be classified with two specific parts of a highly mobile device and the mobile device [5]. The highly mobile devices refers to the size of a mobile phone that can fit into a pocket, feature phones (mobile phones that only support basic SMS), smart phones and other devices such as Flip Camera and mobile devices including iPad and netbooks. Mobile device refers to a larger device such as a laptop.

2012 was the year of the smartphone transmission. Study from Analytic Strategy reveals one billion smartphones are in use worldwide with a ratio of 1: 7 from each user [17]. In Malaysia, the rate of transmission of this smart phone is at 1: 4 user[14]. It also has been found that feature phone users in Malaysia in 2012 were 74.0% of users, while 26.0% are smartphones' users. This is clearly supported by the results of the Commission survey found on average 35% of consumers still use feature phones intend to change the smartphone in 2012, 31.3% said in 2013 and 19.5% suggested in 2014 or subsequent years.

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In the context of learning, the term of mobile learning or m-learning known as mobile learning devices and this is synonymous with the proliferation of technology started in the 21st century. Generally, the concept of mobile learning is related to the use of mobile technology that can be used at anytime and anywhere. Moreover, mobile technology has improved the learning performance and provides a host of new, more active, using wireless technology devices [22]. The study found there is a relationship between the qualities of technical systems (usability, fast response, security system, multiple functions, user interface etc.) that influence the choice of mobile learning applications. In addition, these factors also affect students' satisfaction of the technical aspects. The study of 500 medical students from four faculties at the University College of Health Sciences Niger Delta found the use of smart phones make it easier for them to access materials e-learning [7]. In addition, it easy for them to take notes in the classroom and laboratory, access the college portal, patient information, write, send and access e-publications in scientific journals and others.

II. LITERATURE REVIEW

Theories of individual acceptance in the use of technology are very important to be studied to look at the suitability of the model with a conceptual framework that will be used in this study. There are several models and theories of individual acceptance in the use of technology such as Unified Theory of Acceptance and Use of Technology (UTAUT), Technology Acceptance Model (TAM) and PC Usage model. However, this study focuses on the Unified Theory of Acceptance and Use of Technology (UTAUT) and Theory of Habitual Behavior. Unified Theory of Acceptance and Use of Technology (UTAUT) was formulated with four determinations of intention including performance expectancy, effort expectancy, social influence and facilitating conditions with four moderators (gender, age, experience and voluntariness of use) as a key relationship [24].Fig. 1 illustrates the UTAUT model.

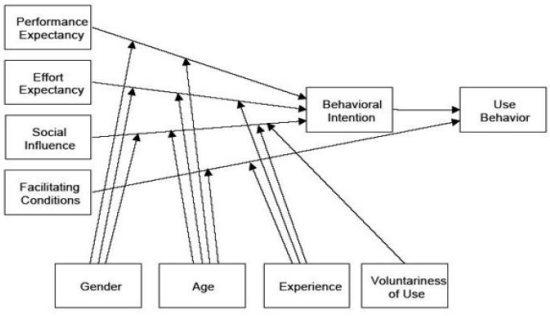

Fig. 1. Unified Theory of Acceptance and Use of Technology (UTAUT)

The unified theory of acceptance and use of technology 2 (UTAUT2) was also adapted from the original theoretical model UTAUT [25]. Fig. 2 illustrates the UTAUT2 model. There are a few changes and additions to this theoretical model in which the predictions of behavioral intention are performance expectancy, effort expectancy, social influences, facilitating conditions, hedonic motivation, prices value and habit. Compared with UTAUT model, the additions indicators proposed in UTAUT2 generate greater value of variance in explaining behavioral intentions (56% to 74%) and the varianceexplained in technology use (40% to 52%) with the existence of the moderator effects of gender, age and experience. In addition, there was also an increase in the variance in direct contact of external factors on behavioral intentions (35% to 44%) and technology (26% to 35%).

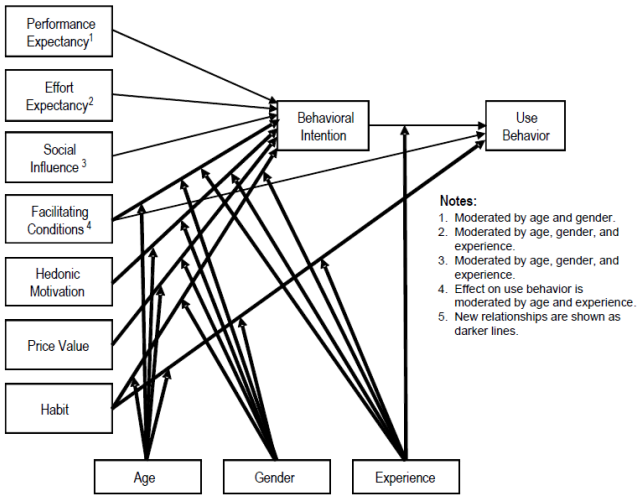

Fig. 2. Unified Theory of Acceptance and Use of Technology2 (UTAUT2)

The uses of mobile phones are norms in society today. The uses are beyond the control and individuals frequently check their mobile phones with less of conscious. This is known as habitual behavior in many of scholar. Habitual behavior is usually identified as the signal of the situation driven automatically that occurs as a result of experiences [8]-[30]. Stronger response of habitual behavior is one of the concrete structures that can overcome behavioral intentions [26]-[27].

Habit isrepeating response with the frequency characteristics without any of goals or purposes that comes from thinking [30]. Habit is active without consciousness with the minimum goals [16]. The study also found habit is strongly influenced by the frequency of behavior. Furthermore, habitual behavior to check the phone is due to various external factors base on situations and emotions like boredom [19]. This indication will drive people to use smart phones in public places and it can be recognized as a habit disorder.The use of mobile phone could be categorized as a habitual behavior, where the use of that device is prevalence and become routine that normally occurs subconsciously [19]. Therefore, this study focuses on the construct of habitual behavior replace the constructs of behavioral intention as in theory UTAUT or UTAUT2 with three main predictors (performance expectancy, effort expectancy and social influence).

III. CONCEPTUAL MODEL & HYPOTHESIS

Fig. 3 shows the conceptual model of this study. Three independent variables were adapted from UTAUT2 are performance expectancy, effort expectancy and social influence, while the dependent variable is the habitual behavior adapted from theory UTAUT2 and Theory of Habitual Behavior. In this study, performance expectancy refers to the student believes usingmobile phone enable them to improve their performance in academic activities, while effort expectancy refers to the notion of student comfort with the use of a mobile phone. Social influence refers to studentperceived that people who are important to them think they should use the mobile phone.Habitual behavior in this study refers to the automatically actionsin which the studentoften less of consciousof mobile phone use in academic activities.

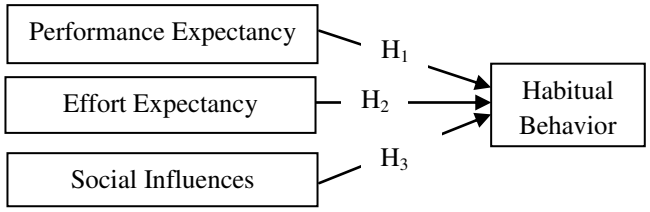

Fig. 3. Conceptual Model

Here are the hypotheses for this study:

H_1 : Performance expectancy has a significant effect on habitual behavior of using mobile phones in academic activity.

H_2 : Effort expectancy has a significant effect on habitual behavior of using mobile phones in academic activity.

H_3 : Social influence has a significant effect on habitual behavior of using mobile phones in academic activity.

IV. METHODOLOGY

A) *Respondent*

Population in this study consisted of12, 041 of UPM's undergraduate students who stayed in the 17 residential colleges until of May, 2015. In determining the size of the sampling, the researcher considerstwo of techniques, stratified random sample [6] and structural equation modeling sample [9].

B) *Sampling Technique*

According to the both of calculations, the minimum number of samples is respectively 255 and 300 people. In order to estimate the model precisely, researchers chose the minimum number of samples 300 and also added 40% of questionnaires to the actual sample and overall total was 420 people.

C) *Respondent*

There are five parts of instruments in this study, included Part A, B, C, D and E. Part A consist of students demographic, while part B, C and D consist of the main

constructs to measure the factors that influence students'habitual behavior on using mobile phone. Part E consistthe construct of habitual behavior. The instruments were distributed through the committee members of the college and had been recovered within two weeks. Analysis of the data in this study was made using SPSS and Amos 22.

V. FINDINGS

A) Demographic Information

Table 1 shows the demographic information. Out of 393data were still remains after remove the outliers. Respondents ages involved in this study are ranged from 18 to 27 years. The highest numbers of respondents involved in this study are among those in age 20 to 24 years. In can be observed from this table, the numbers of female respondents (53.9%) are greater than male (46.1%). The respondents consisted of 212 women and 181 men. In terms of race, the Malay respondents were the high participants (80.7%), followed by Chinese (11.5%), Indian (4.8%) and others (3.1%). All respondents in this study have a cell phone and the applications. The applications consisted of WhatsApp, Facebook, Instagram, Wechat, Email, Twitter, Telegram and Viber.

Table 1
Demographics (N=393)

		Frequency	Percent
Age	18	3	.8
	19	17	4.3
	20	110	28.0
	21	98	24.9
	22	69	17.6
	23	60	15.3
	24	23	5.9
	25	10	2.5
	26	2	.5
	27	1	.3
Gender	Male	181	46.1
	Female	212	53.9
Race	Malay	317	80.7
	Chinese	45	11.5
	Indian	19	4.8
	Others	12	3.1
Mobile Phone	Yes	393	100.0
	No	0	0
Applications	Yes	393	100.0
	No	0	0

B) Reliability & Descriptive Analysis

Table 2 shows the reliability of Cronbach Alpha coefficient for the pilot study and the actual study. The reliability of all constructs wasexceeding .70. Thus, all constructs are acceptable [9].

Table 2
Cronbach's Alpha Coefficient

Part	Variables	Pilot Study (n=40)	Actual Study (n=393)
A	Demographic	-	-
B	Performance Expectancy	.775	.795
C	Effort Expectancy	.872	.757
D	Social Influence	.815	.774
E	Habitual Behavior	.872	.881

Table 3 shows the descriptive statistics for each construct. Based on the results, the highest mean belong to the construct of effort expectancy followed by performance expectancy. This shows the students thought the use of mobile phone is easy to learn and easy to use. Additionally, through performance expectancy, student believes mobile phone can help them in learning and has a positive impact on them.

Table 3
Descriptive Statistics

Constructs	Code & Items		Min	SP
Performance Expextancy	JP2	Using mobile phone enables me to accomplish my learning activity more quickly.	3.95	0.75
	JP5	Using mobile phone would improve my performance in my study.		
	JP7	Using mobile phone for learning purposes would save me a lot of time		
	JP8	I think that mobile phone system is helpful for my learning.		
	JP9	Overall, I would find mobile phone usage brings advantages for learning purposes.		
Effort Expectancy	JU3	I find it easy to use mobile phone to do what I want to do.	4.23	0.68
	JU8	To bring mobile phone wherever I go is convenient because it is light weight.		
	JU9	Learning to operate the mobile phone is easy for me.		
	JU10	Overall, I find mobile phone is easy to use / user friendly.		
Social	PS4	In general, the	3.63	0.90

Influences		university has supported the use of mobile phone for learning.		
	PS5	Lecturers have influenced me a lot in using mobile phone.		
	PS6	My lecturer is very supportive in using mobile phone.		
Habitual Behavior	PT2	Unconsciously, I am addicted to use mobile phone for learning.	3.63	0.92
	PT3	I must use mobile phone to contact my classmates or lecturer when I need to know anything about academic tasks		
	PT8	I always try to use mobile phone in order to get informations about learning activities.		
	PT10	Using mobile phone is the first choice when I have discussion about my learning activities		

C) *Measurement Model*

Measurement model developed by combining all latent constructs simultaneously into a diagram. It is also a step to analyze multiple models with combinationof all CFA and known as pooled-CFA. The first thing that can be seen is the multicollinearity or correlation between the constructs. The correlation between constructs is highly correlated when it value exceeds 0.85 [33]. In this analysis, the item of JU3 should be removed because of it has highly correlated with performance expectancy. Fig. 4 shows no construct are high correlation between the construct after JU3 has been removed.

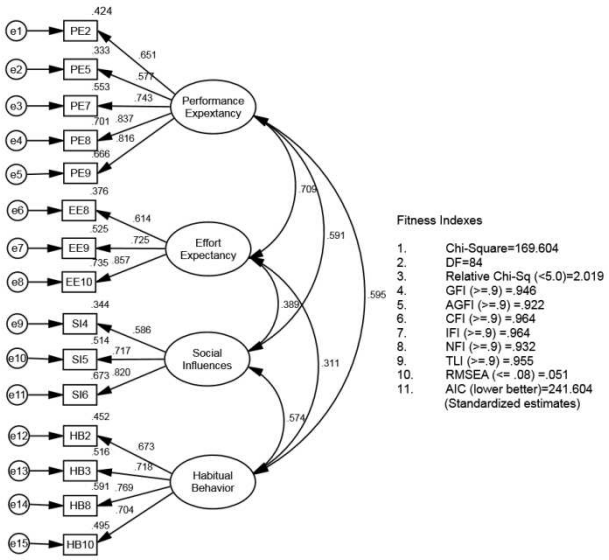

Fig. 4. Measurement Model

D) *Confirmatory Factor Analysis*

The CFA aims to test and evaluate the validity of the model fit. There are three types of validity that must be achieved in order to get the model fit and reliable including construct validity, convergent validity and discriminant validity.

Construct Validity

In analyzing construct validity, the first thing to look at is the fit indices. If the indices are fit, construct validity for the CFA model is reached. There are three categories fit model known as Absolute Fit, Incremental Fit and Fit parsimonious [9]. Table 4shows the details of three categories of fit indices.

Table4
Categories of Model Fit

Categories	Name of Index	Index Full Name	Acceptance Value
Absolute fit	Chi-Square	*Discrepancy Chi Square*	P-Value > 0.05 (Not applicable for large sample size, more than 200)
	RMSEA	*Root Mean Square of Error Approximation*	RMSEA < 0.08
	GFI	*Goodness of Fit Index*	GFI > 0.90
Incremental fit	AGFI	*Adjusted Goodness of fit*	AGFI > 0.90
	CFI	*Comparative Fit Index*	CFI > 0.90
	TLI	*Tucker-Lewis Index*	TLI > 0.90
	NFI	*Normed Fit Index*	NFI > 0.90
Parsimonious fit	Chisq/df	*Chi Square/Degrees of Freedom*	Chi-Square/df < 3.0

Based on the structural model in this study (see Fig. 5), the values of the index is fit. Chi-squared showed a value of 169,604 with 84 degrees of freedom (p <.05). All fit indices (GFI, GFI, CFI, IFI, NFI and TLI)must be (> =. 9) in order to achieve a good fit. However, all fit indexeswere reached (> =. 9) with the GFI = .946, AGFI =

.9 22, CFI = .964, IFI = .964, NFI and TLI = .932 = .955. RMSEA values also recorded 0.051 (<=. 08). It means that all the fit indices was achieved for restructuring model.

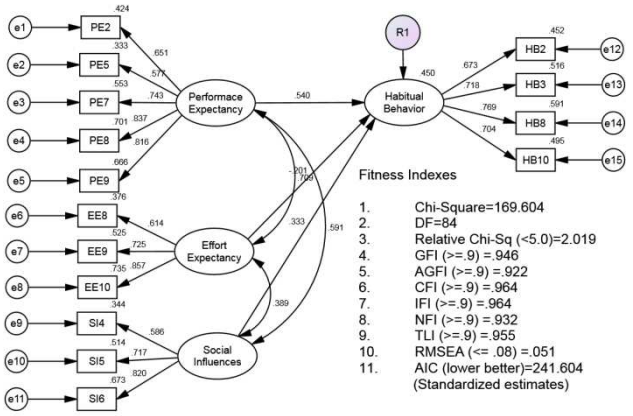

Fig. 5. Structural Model

Convergent Validity & Reliability

The next analysis is about convergent validity and reliability. Convergent validity of the construct achieved when the AVE exceeds 0.50 [9], while construct reliability (composite reliability) reached when the CR is over or equal to 0.70 [21]. Table 5 shows all constructs with AVE values exceeding 0.50, while the value of CR exceeding 0.70. These results prove the convergent validity and construct reliability in this study are reached.

Table 5
The Report of Convergent Validity & Reliability

Construct	Items	Factor Loading	AVE (minimum 0.5)	CR (minimum 0.6)
Performance Expectancy	PE2	.651	0.535	0.850
	PE5	.577		
	PE7	.743		
	PE8	.837		
	PE9	.816		
Effort Expectancy	EE8	.614	0.546	0.780
	EE9	.725		
	EE10	.857		
Social Influences	SI4	.586	0.510	0.754
	SI5	.717		
	SI6	.820		
Habitual Behavior	HB2	.673	0.514	0.808
	HB3	.718		
	HB8	.769		
	HB10	.704		

Discriminant Validity

Discriminant validity is achieved when the AVE's for two overlapping constructs exceeding the value of multiple correlation (AVEs> r2). In other word, when the square root of AVE greater than values of correlation, discriminant validity is achieved. In addition, the correlation (R) should not exceed 0.85 to prove that there is no overlapping between the two constructs [33]. Table 6 shows the diagonal values (in bold) is the square root of AVE is greater than the values of correlation between the respective constructs. It can be concluded that the discriminant validity for all constructs are achieved.

Table6
Discriminant Validity Analysis

Constructs	Performance Expectancy	Effort Expectancy	Social Influences	Habitual Behavior
Performance Expectancy	**0.731**			
Effort Expectancy	0.709	**0.739**		
Social Influences	0.591	0.389	**0.714**	
Habitual Behavior	0.595	0.311	0.574	**0.717**

E) Result and Analysis

Table 7 shows the analysis of exogenousconstruct of performance expectancy, effort expectancy and social influences on habitual behaviorin using mobile phone among students in UPM. Based on this, the first hypothesis (H_1) shows the performance expectancy has a significant effect on the habitual behavior (β = .857, p <0.001). Therefore, these results suggest $H_1$is supported. The second hypothesis (H_2) shows that effort expectancy has a significant effect on habitual behavior (β = -.367, p <0. 05). Therefore, these results conclude $H_2$is supported. The third hypothesis (H_3) shows that social influence has a significant effect on the habitual behavior (β = .496, p <0.001). Therefore, these results also suggest $H_3$is supported.

Table 7
Results of Analysis

Hypothesis	Construct			Beta	S.E.	C.R.	P	B	Results
H_1	HB	<--	PE	.857	.174	4.917	***	.540	Significant
H_2	HB	<--	EE	-.367	.160	-2.289	.022	-.201	Significant
H_3	HB	<--	SI	.496	.118	4.206	***	.333	Significant

S.E : *Standard Error of regression weight*
C.R : *Critical Ratio for regression weight*
P : *Level of significant*
*** p < .005
R^2 : 0.450

From the results of this analysis, it has been found performance expectancy, effort expectancy and social influences have a significant effect on habitual behavior. The strongest predictors of habitual behavior are performance expectancy and social influence. Here is a summary of the findings for the first hypothesis to the third hypothesis in this study.

Table 8
Summary of Analysis $H_1 – H_3$

Hypothesis	Construct	Beta	Results
H_1	PE ->HB	.857***	Significant
H_2	EE ->HB	-.367*	Significant
H_3	SI -> PT	.496***	Significant

H:Hypothesis; Beta: Standardized regression coefficient weight; *** p<.001; ** p<.01; *p<.05;
PE:Performance Expectancy; EE:Effort Expectancy; SI:Social Influences; HB:Habitual Behavior

IV. DISCUSSION

The model proposed in this study consisting three exogenous constructs such as performance expectancy, effort expectancy and social influence, while habitual behaviorasendogenous constructs. The constructs of this model fully adapted from UTAUT, UTAUT2 and the theory of Habitual Behavior. In this study, the items of the constructs were measured using five Likert scale. Models of this study were tested Structural Equation Model (SEM). Construct of habitual behavior in this study replace behavioral intention as a model of UTAUT. Items for the constructs of habitual behavior developed through a combination of variables habit in the UTAUT2 model with variable of habitual behavior in the Theory of Habitual Behavior. Data were analyzed using SEM analysis to examine the relationship between constructs and model fit. The results show performance expectancy, effort expectancy and social influences have a significant effect on the students' habitual behavior. In other word, the factorsinfluence students' habit in using mobile phone for academic activities.

This study varies from previous studies in which most of them focuses on the factors that influence behavioral intention in the use of technology, in terms of academic activities. This is includes the studyof the use of mobile technology such as smartphones, iPhone, tablets, laptops and PDAs [11]-[10]-[1]-[3], the study on mobile learning [15]-[31], the study on the use of Learning Management System (LMS) [20]-[23], the study of receiving e-learning technology [13] and so on.

Through previous studies, majority of researchers in the study focused on the relationship between the factors on behavioral intention in the use of technology. Through the findings in this study, the factors (performance expectancy, effort expectancy, social influence) influence student habitual behavior. This means that these external factors can affect not only the intention of the students in the use of technology, but also able to affect the habit of student behavior.

VI. CONCLUSSION AND SUGGESTIONS

The conceptual model for this study is to predict the students'habitual behaviorin actual use of technology in which adapted from UTAUT and UTAUT2 model, also the theory ofhabitual behavior. However, the original structure of UTAUT and UTAUT2 were to determine the intention of consumer behavior and the behavior of the actual use of technology. Through these model, theindependent variables (performance expectancy, effort expectancy, social influences and facilitating conditions)seen to have a significant effect on behavioral intentions and the actual use of technology. The result of original UTAUT stated the variablesexplains 35% of variance on behavioral intentions while the UTAUT2 explains 44% of variance on behavioral intentions with additional independent variables including hedonic motivation, habits and price value [25]. In addition, the UTAUT model explains the direct effectof facilitating conditions and behavioral intentions on actual use of technology with 26% of variance, while the UTAUT2 model explains the direct effect of facilitating conditions and behavioral intentionson the actual use of technology with 35% of variance.

However, in this study the results showed performance expectancy, effort expectancy and social influences have a direct effect on habitual behavior, contributing 44.9 or 45% of the variance adjusted. This value is higher (by 0.9%) compared to the original model UTAUT2. This is shows that factor is relevant for predicting the habitual behavior than to predict behavioral intention as in the previous model of UTAUT2 and UTAUT. The finding of this analysis contributes one of the ideas in which to measure habit other than behavioral intentions as in the original concept. Furthermore, the results of the study found that the factors have significant effects on the students' habitual behavior in using mobile phones for academic activities. This finding is consistent with previous studies that emphasize the use of technology especially mobile phones can be categorized as habitual behavior when the use are often with less of conscious [8]-[30]-[26]-[27]-[16]-[19].

As empirical studies, there are some limitations in this study should be noted. The respondent in this study consisted undergraduate students from one of public university in Malaysia (UPM). Further study may be continued with other public universities or private universities. The variables in this study only focused on UTAUT and UTAUT2 model. Further studies may be executed withother theoretical model oftechnologies such as TAM, PC Usage Model and so on in order to examine the individuals' habitual behavior on using mobile phone particularly in academic activities..

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