INTERNATIONAL JOURNAL OF ACADEMIC RESEARCH IN BUSINESS & SOCIAL SCIENCES

Vol 13, Issue 12, (2023) E-ISSN: 2222-6990

Exploring the Factors that Influence Smartphone Usage for Learning among Students at A Public University in Malaysia

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To Link this Article: http://dx.doi.org/10.6007/IJARBSS/v13-i12/20345 DOI:10.6007/IJARBSS/v13-i12/20345

Published Date: 26 December 2023

Abstract

Smartphones have become essential in student life, especially for educational purposes. This study examines smartphone usage for learning among students at a Malaysian public university. The research utilised correlational research design to investigate the relationships between habitual behaviour, hedonic motivation, and facilitating conditions on students' smartphone usage for learning. Responses from 373 students were collected for this purpose using stratified random sampling. The results demonstrate a strong positive correlation between habitual behaviour and smartphone usage for learning, indicating the crucial role of habitual behaviour. The correlations between hedonic motivation and facilitating conditions with smartphone usage for learning were significant, although relatively weaker. The results of the multiple regression analysis highlighted the significant impact of habitual behaviour, which accounted for 88.1% of the observed variance, on smartphone usage for learning. The findings highlight the importance of routine behaviour on students' use of smartphones for academic purposes, offering valuable insights for educators and institutions seeking to enhance the integration of smartphones in educational environments.

Keywords: Utaut, Utaut2, Mobile, Phone, Cellphone, Habit

Introduction

The influence of mobile phones on modern life is always evolving as technology progresses. The penetration rate for smartphone users in Malaysia has reached a record-breaking high of 94.8% in 2021 (MCMC, 2021). According to the hand phone users survey conducted by Malaysian Communications and Multimedia Commission (MCMC) in 2021, smartphone users in Malaysia engaged in a higher number of communication and social activities compared to transaction-based activities. The most common daily activities were text messaging (82.9%), social networking (78.9%), voice calls (78.6%), and video calls (71.0%). On the other hand, shopping (41.1%) and banking (38.9%) were among the least often conducted activities

(MCMC, 2021). The growing number of smartphones signifies a greater level of digital connectivity among individuals in Malaysia.

The same phenomenon is also mirrored across all regions globally, regardless of the developing or developed countries. A previous study reported that between 72% and 93% of individuals aged 18 to 29 reported owning a mobile phone in Zimbabwe (Doyle et al., 2021). In a survey conducted in South Korea, 25.6% of male students and 38.4% of female students utilised their smartphones for a minimum of 30 hours per week (Cho et al., 2020). The findings show that a substantial number of students are frequent users of mobile phones worldwide.

Smartphones have become essential in student life due to many factors, especially for educational purposes. Previous research investigated the influence of mobile phone usage on academic performance and learning outcomes. Prasad et al. (2017) conducted a study to examine the relationship between mobile phone usage and academic performance among students. Evidence indicates that students extensively utilise smartphones and access education apps, which results in enhanced educational experiences (Singh et al., 2021).

The COVID-19 pandemic has resulted in a rise in smartphone usage among university students (İzzet Fidancı et al., 2021). The pandemic has also stimulated investigations on the implications of excessive smartphone utilisation on online distance learning (Munusamy & Ghazali, 2022; Othman & Mohd Amin, 2022; Saadeh et al., 2021). Recent research on smartphones has focused on the consequences of excessive smartphone utilisation, specifically in relation to the pandemic and its impact on online education. A recent study conducted by Yusoff et al. (2022) investigated the effects of excessive smartphone usage on online distance learning in public university students in Klang Valley, Selangor, Malaysia. The study focused on the ergonomic aspect and emphasised the importance of addressing the challenges associated with smartphone addiction.

In Malaysia, various research studies regarding the usage of smartphones among students have been conducted. A nationwide study conducted in Malaysia found a notable prevalence of smartphone addiction, which affects approximately 40% of adolescents in Malaysia (Lee et al., 2023). Munusamy and Ghazali (2022) conducted a study on behaviour factors and smartphone addiction among students in four public universities in the Klang Valley, Malaysia. The majority of the respondents were found to spend over 12 hours on Internet usage. Their findings also indicate a relationship between smartphone addiction and behavioural factors, specifically loneliness, shyness, and stress. While acknowledging Malaysian students' strong attachment to their smartphones, it is worth noting that their social engagement via mobile phones primarily consists of online communication and social media activities. The focus of this study is on the use of smartphones for learning purposes, such as accessing educational resources, communicating with peers or lecturers about academic issues, and engaging in learning-related interactions.

The present study strives to close the gap and narrow the research focus to the usage of smartphones for learning among Malaysian students. Abbas et al. (2020) specifically highlighted that smartphones were perceived primarily as a source of distraction in the classroom rather than a tool for learning. The presence of smartphones in the classroom led to distractions that diverted students' focus away from their studies. Hence, it is imperative to understand the perspectives of Malaysian students in using their smartphones for academic purposes. Therefore, in the present study, we seek to examine the relationship between factors (habitual behaviour, hedonic motivation, and facilitating conditions) and smartphone usage for learning. The research questions of this study are the following:

1. Is there any relationship between habitual behaviour and the use of smartphones for learning among students at a public university in Malaysia?
2. Is there any relationship between hedonic motivation and the use of smartphones for learning among students at a public university in Malaysia?
3. Is there any relationship between facilitating conditions and the use of smartphones for learning among students at a public university in Malaysia?
4. What are the factors influencing the use of smartphones for learning among students at a public university in Malaysia?

Literature Review

The Unified Theory and Acceptance of Using Technology 2 (UTAUT2), a modified version of the original UTAUT model developed by Venkatesh, Thong, and Xu (2012), incorporated three additional factors: hedonic motivation, price value, and habit. The revised model includes minor adjustments, assessing behavioural intention through external variables such as performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivations, price value, and habit (refer to Figure 1).

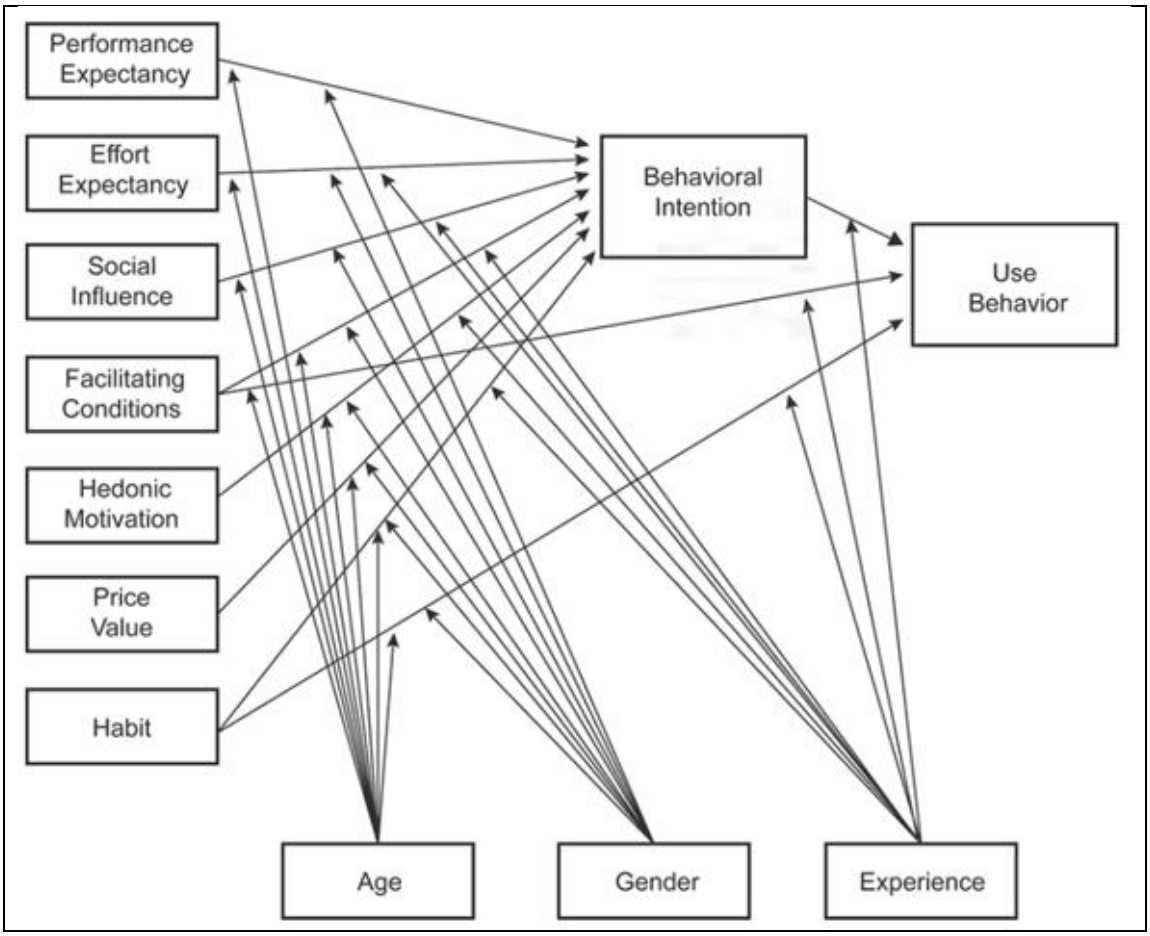

Figure 1. Unified Theory and Acceptance of Using Technology 2 (UTAUT2)

The UTAUT2 widely used in studies exploring the adoption of technology. Use behaviour indicates the actual usage of technology. In discussing the behaviour of actual use of technology, Venkatesh et al. (2012) did not test the direct impact of external variables (i.e., hedonic motivation and facilitating conditions) on technological use behaviours, but the

relationships are moderated through behavioural intention construct. Several recent studies examined the influence of external variables on behavioural intention, and their findings argued that external variables (i.e., habit) weaken the relationship between intention and behaviour (Gardner et al., 2020; Rebar et al., 2019).

According to the Theory of Habitual Behaviour, repetition of activities in specific contexts results in the formation of automatic reflexes, which leads to the development of habits (Verplanken & Aarts, 1999). As students consistently rely on their mobile phones to access course materials, communicate with classmates, or manage their calendars, habitual behaviour can occur in the context of academic work involving mobile phone usage. Habitual behaviour refers to the usage patterns that develop when students integrate smartphones into their academic routines over an extended period of time. This present investigates the relationship between habitual behaviour and the use of smartphones for learning among students.

On the other hand, hedonic motivation refers to the tendency to engage in activities that amplify pleasurable or positive experiences, as well as actions that diminish unfavourable experiences (Kaczmarek, 2017). The relationship between hedonic motivation and use behaviour is important, as demonstrated by numerous studies. Out of 79 empirical studies employing UTAUT2 in a meta-analysis study, researchers reported that 46 studies, accounting for 58%, incorporated hedonic motivation, whereas the remaining 33 studies, totaling 42%, excluded this particular construct (Tamilmani et al., 2019), which emphasise the importance of hedonic motivation in comprehending user behaviour. Sequeiros et al. (2021) offer additional empirical proof by demonstrating that hedonic motivation is a reliable indicator of both behavioural intention and actual use behaviour in the field of IoT smart home services. The findings from previous studies not only demonstrate the immediate effect of hedonic motivations on intention but also highlight its relationship with the practical implementation and use of technology.

Multiple studies provide strong evidence for the relationship between facilitating conditions and technological use behaviour. Gupta and Arora (2019) emphasise that facilitating conditions have a significant influence on behavioural intention, which in turn affects the use behaviour in mobile payment systems. The relationship implies that when favourable conditions, such as easy access or robust system assistance, are in place, they not only shape the inclination to utilise but also directly affect the real usage of the technology. In a similar study, Chang et al. (2019) provide further support by illustrating the positive relationship between facilitating conditions and the behavioural intention to engage, which subsequently affects actual use behaviour. These findings highlight that a supportive environment plays a significant role in influencing the actual usage behaviour of using technology.

Moreover, empirical evidence from studies conducted on various technology usage supports the notion that facilitating conditions have a direct impact on use behaviour. For instance, Abd-Alrazaq et al. (2019) provide direct evidence of the substantial impact of facilitating conditions on usage behaviour, confirming that the presence of these favourable conditions directly enhances the actual adoption of the technology. In addition, Guo (2017) and Andwika and Witjaksono (2020) also support this notion by demonstrating the significant relationship between facilitating conditions and use behaviour. They emphasise that when users perceive a supportive environment for system use, it encourages them actually to utilise the system. The cumulative evidence from the literature strongly supports that facilitating conditions have a crucial impact on shaping behavioural intentions and, consequently, the actual utilisation of technology. This highlights the significant relationship between facilitating

conditions and use behaviour. Henceforth, this present study strives to explore the relationship between facilitating conditions and students' smartphone usage for learning.
This study seeks to investigate the relationship between the factors from the UTAUT 2 and the theory of habitual behaviour in the specific context of smartphone usage for learning among students at a public university in Malaysia. The diagram illustrating the conceptual framework shown in Figure 1 is being presented.

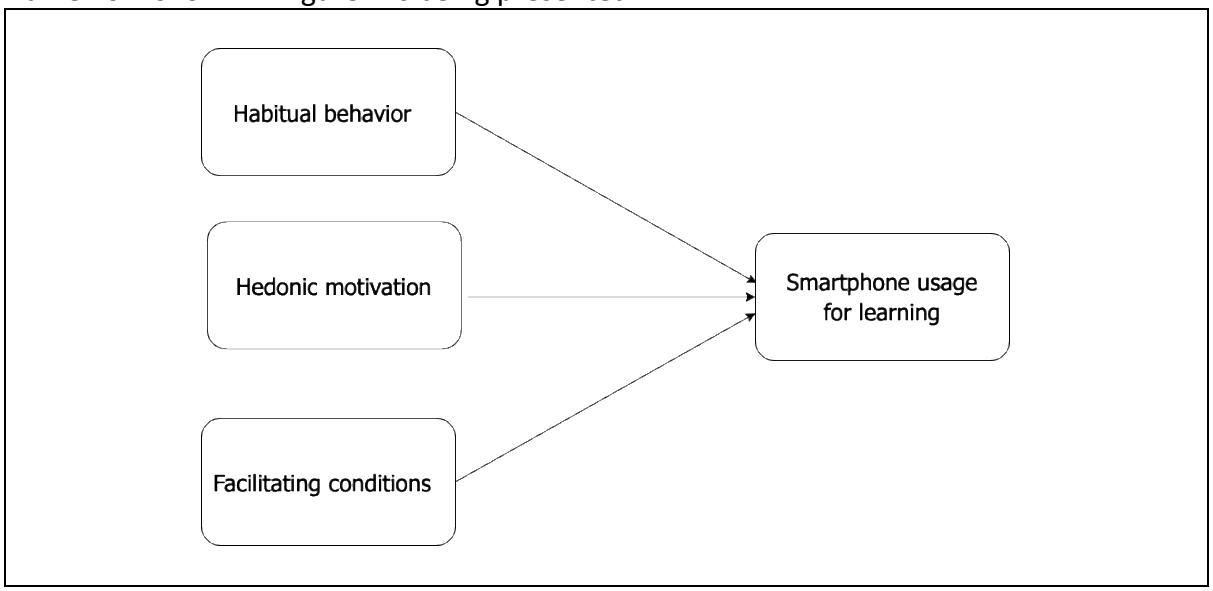

Figure 2. Conceptual framework

Methodology

The objective of this study is to identify the factors that influence smartphone usage for learning among students at a public university in Malaysia. The research methodology employed in this study is the correlational design. A correlational study enables the researcher to determine the extent of the relationship or make predictions about specific outcomes between two or more variables by utilising the correlation coefficient.
To facilitate data collection, the researcher utilised a questionnaire. The purpose of the questionnaire in this study is to assess the students' opinions and understandings of the aspects that impact their smartphone usage for learning purposes. The use of questionnaires is advantageous due to their ease of distribution and their ability to reach a large number of individuals simultaneously. Moreover, the questionnaire serves as a valuable tool for gathering organised and quantitative data. It may be administered independently or without the researchers' presence (Cohen et al., 2018)
The 373 students were selected using a stratified random sampling from 17 colleges at a public university in Malaysia. The original instrument is written in the English language. The instruments had several modifications and were subsequently translated into Malay. Three linguists have been appointed for the task of language translation, and two experts to validate the instrument.
A pilot study is carried out to evaluate the instruments that have been designed by examining the accuracy and consistency of the research tool prior to the main study. For the pilot study, a sample of 40 students from a college has been chosen as participants. All of the analysed constructs have Cronbach's alpha coefficients that surpass the criterion of 0.70. Consequently, all constructs are considered appropriate.

Before conducting the correlation analysis, a thorough parametric evaluation was carried out. Statistical techniques were used to conduct normality tests in order to verify the normal distribution of the data. In order to eliminate the possible influence of outliers on the analysis, box plots were utilised to detect and appropriately address the outliers precisely. It was essential to carry out the implementation of these parametric tests prior to executing the further analyses, which will be further explained in the next section.

Results

A Pearson correlation analysis was performed to determine the relationships between the three independent variables (i.e., habitual behaviour, hedonic motivation, and facilitating conditions) and smartphone usage for learning. The correlation coefficient between the mean values of each independent variable and the mean value of smartphone usage for learning is presented in **Error! Reference source not found.**.

Table 1
Correlation Coefficients Between Students' Performance Expectancy, Effort Expectancy, Social Influence And Smartphone Usage For Learning

	Habitual behaviour	Hedonic motivation	Facilitating conditions
Smartphone usage for learning	.857	.149	.207

The results indicated a significant and positive correlation between habitual behaviour and smartphone usage for learning (r = .857**, p = .01). In addition, a significant positive correlation is observed between hedonic motivation (r = .149**, p = .01) and smartphone usage for learning, as well as between facilitating conditions (r = .207**, p = .01) and smartphone usage for learning. The results indicate that habitual behaviour has the greatest impact on smartphone usage for learning. The correlation coefficient (r) value of .857 indicates a strong relationship between the mean of habit and the mean of smartphone usage for learning. The data demonstrates that students who possess strong habitual behaviour are more likely to use smartphones actively for their learning.

In addition to habitual behaviour, which has the strongest relationship with smartphone usage for learning, two other independent factors they also demonstrated correlations with smartphone usage for learning. The correlation coefficient between the mean of hedonic motivation and the mean of smartphone usage for learning is 0.149, with a significance level of 0.01. This correlation demonstrates a weak positive relationship, indicating that students' hedonic motivation contributes to students' smartphone usage for learning.

Similarly, the correlation coefficient (r) between facilitating conditions and smartphone usage for learning is found to be .207, indicating a weak positive relationship. This relationship was significant at the .01 level. This suggests that facilitating conditions have a weak impact on the students' smartphone usage for learning. Hence, the three independent variables have been identified as the key determinants influencing smartphone usage for learning among students at a public university in Malaysia.

A regression analysis was conducted to explore the factors that influence students' smartphone usage for learning. The multiple correlation coefficient, as displayed in Table 2, was determined to be .738. The number indicates that around 73.9% of the variance of

smartphone usage for learning is accounted for by students' habitual behaviour, hedonic motivation, and facilitating conditions.

Table 2
Model Summary

Model	R	R Square	Adjusted R Square
1	.859[a]	.739	.737

The findings in Table 3 indicate that the factors being studied were determined to have a statistically significant relationship, with a significance level of 0.05. This is verified by the analysis of variance (ANOVA) test, which produced a substantial F-value of 366.562. The p-value was determined to be less than .001, providing further evidence of the statistical significance of the contributing factors. The finding indicates that the factors (i.e., habitual behaviour, hedonic motivation, and facilitating conditions) examined in this study are important predictors for determining smartphone usage for learning among students at a public university in Malaysia.

Table 3
ANOVA test results

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	120.610	3	40.203	366.562	.000[b]
Residual	42.664	389	.110		
Total	163.275	392			

The results of the multiple regression analysis, presented in Table 4, indicate that both habitual behaviour and facilitating conditions exhibit a significant relationship with smartphone usage for learning. However, an insignificant relationship between hedonic motivation and smartphone usage for learning was discovered.
The relative significance of predicting factors impacting smartphone usage for learning was evaluated by analysing the beta values (β). The results indicated that habitual behaviour (β = .881) and facilitating conditions (β = .067) were the primary determinants of smartphone usage for learning. In conclusion, the findings suggest that habitual behaviour explains 88.1% of the observed variance in students' smartphone usage for learning, whereas facilitating conditions accounted for 6.7% of the observed variance in students' academic mobile phone habitual behaviour.

Table 4
Model Coefficients

Model	Unstandardised Coefficients		Standardised Coefficients	t	Sig.
	B	*Std. Error*	*Beta*		
(Constant)	1.795	.163		11.036	.000
Habitual behaviour	.808	.025	.881	32.066	.000
Hedonic motivation	-.021	.040	-.015	-.520	.603
Facilitating conditions	.089	.039	.067	2.296	.022

a. Dependent Variable: Smartphone usage for learning

Discussion

The findings of this study highlight the significant relationships between various factors, such as habitual behaviour, hedonic motivation, facilitating conditions, and smartphone usage for learning among students at a Malaysian public university. The results demonstrate a positive relationship between habitual behaviour and smartphone usage for learning, indicating that students who have a stronger habitual behaviour are more actively involved in using smartphones for educational purposes. This supports the claim that regular behaviour has a significant impact on the incorporation of smartphones into academic learning routines (Peng et al., 2021).

Furthermore, the findings also reveal that facilitating conditions and hedonic motivation exhibited positive correlations with smartphone usage for educational purposes. However, these relationships were relatively weaker in comparison. Although the correlations may be weaker, their significance suggests that they play a significant role in influencing students' usage of smartphones for academic tasks. The relationship between hedonic motivation, which involves pleasure and enjoyment, and students' smartphone usage for learning was found to be slightly positive, indicating that hedonic motivation contributes to smartphone usage for learning, although to a lesser degree. Likewise, the presence of facilitating conditions, which refers to support from the system, had a slight but still significant effect on students' use of smartphones for learning purposes. The findings corroborate the previous, as reported in Sequeiros et al. (2021) and Chang et al. (2019).

The multiple regression analysis provided additional evidence of the importance of the factors (i.e., habitual behaviour, hedonic motivation, facilitating conditions) in predicting smartphone usage for educational purposes. The factor that had the strongest impact on students' smartphone usage for learning among students was habit, which accounted for a significant 88.1% of the observed variance. Furthermore, there was a significant relationship between facilitating conditions and smartphone usage for learning among students. Nevertheless, the study revealed no significant relationship between hedonic motivation and smartphones usage for educational purposes. To ensure students effectively use smartphones for learning, it is crucial first to develop a habit of using them regularly. This approach guarantees that students obtain optimal advantages from incorporating smartphones into their learning routines. To cultivate habit formation, public universities can implement consistent practices, such as integrating mobile-based learning activities into the curriculum or promoting apps and platforms specifically tailored for educational purposes.

Limitations and Recommendations for Future Studies

There are some limitations in this study. It is crucial to highlight that the sample population employed in this study was restricted only to students at one public university in Malaysia. Hence, the study's findings may have limited generalizability in terms of their relevance to a wider population or varied academic environments. Moreover, employing residential colleges as the sampling framework may mistakenly omit students who do not live in these particular accommodations, consequently eliminating the viewpoints of commuting or off-campus students. Using only self-reported questionnaires may involve response bias or social desirability bias, which could compromise the accuracy of the collected data.

There are several future research recommendations. Additional research in this area could involve doing a comparative analysis among different demographic groups within the student population in order to obtain a more thorough understanding of the intricacies associated with the use of mobile phones for academic reasons. In order to achieve a more

comprehensive viewpoint, it is recommended to incorporate a variety of characteristics, such as age, field of study, and socioeconomic background, into the sampling technique.

Conclusion

The objective of this study is to examine students' smartphone usage for learning among students by investigating its relationship with three (3) main factors: habitual behaviour, hedonic motivation, and facilitating conditions. The research focused on students at a Malaysian public university, utilising correlation research design and data collection through questionnaires. The results highlighted the significant influence of habitual behaviour and facilitating conditions on smartphone learning. Nevertheless, the hedonic motivation did not demonstrate a significant relationship. This study provides significant insights into how habitual behaviour and facilitating conditions affect students' smartphones among students.

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