# DETERMINANTS AFFECTING BEHAVIOURAL INTENTION OF USING QR CODES ASA LEARNING TOOL

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**ABSTRACT**

Quick Response (QR) code is a popular kind of matrix barcode invented by Denso Wave, permitting its contents to be interpreted swiftly by QR code scanner. It is scannable using cameras in smartphones and tablet computers, consequently preventing inconvenience and probable mistakes of keyboard input.However, QR codes are relatively new and the awareness of adopting QR codes in learning among the students is still low in Malaysia. This study was conducted to investigate the determinants affecting the behavioural intention of using QR codes as a learning tool based on Unified Theory of Acceptance and Use of Technology2 (UTAUT2). Data collected from 275 undergraduate students of private universities in Perak State were tested against the research model using multiple linear regression analysis. The results showed that performance expectancy, effort expectancy, social influence, facilitating conditions and hedonic motivation have a significant and positive relationship on behavioural intention in using QR codes as a learning tool. This study provides implications for the acceptance of using QR codes as a learning tool in terms of both theoretical and practical.

**KEYWORDS:** QR codes, Learning Tools, UTAUT2 Model, Behavioural Intention, Malaysia.

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**INTRODUTION**

Quick Response (QR) code is a popular kind of matrix barcode invented by Denso Wave, permitting its contents to be interpreted swiftly by QR code scanner (Byrne, 2011; Jupiter, 2011). It is scannable using cameras in smartphones and tablet computers, consequently preventing inconvenience and probable mistakes of keyboard input (Latif, Fadzil, Munira, & Ng, 2012). QR code can be generated through several free QR code generators (Sharma, 2013) and since they are versatile, the QR code readers could connect the users to abundant information embedded rapidly such as Uniform Resource Locator (URL), audios, videos, text and images (Byrne, 2011). Pulliam and Landry (2010) mentioned that QR code displays excellent size variability and error rectification capabilities against dirt or damage up to 30%. It is dynamic and also an ISO (International Organization for Standardization) standard. These advantages have made them widely adopted around the world for product tracking, advertising, managing industrial operations and others (Rivers, 2009).

Additionally, the growing ubiquity of mobile devices had raised the interest of QR codes in education (Law & So, 2010). In Malaysia, the penetration rate of mobile phone subscription as per end of first quarter of 2014 is 143.7% (Malaysian Communications and Multimedia Commission, 2014). With the popularity of smartphones and tablets, a new aspect for the progress of mobile learning (m-learning) is provided by the implementation of a novel innovation like QR codes (Latif et al., 2012) given that the research of QR codes in education is considered in the case of m-learning (Law & So, 2010). Furthermore, government is committed to integrating education sector with technology by contributing RM168 million from the total allocation of spending on education sector in 2014 budget to expand Internet access (Ministry of Finance Malaysia, 2013).

QR codes have rich potential in education. Simple and speedy retrieval of QR codes allow them to become excellent educational tools during teaching and learning processes. It encourages innovative educators to explore their utilization in their educational endeavors (Law & So, 2010). The University of Bath is the primary runner of promoting QR codes in education such as adopted in library catalogue search on bibliographic details of books, student assignment with coversheet associated with QR codes, posters, Websites and for marketing purposes (Law & So,

2010). Latif et al. (2012) conducted a study on 62 learners in Open University Malaysia (OUM) and found that majority of them are satisfied in utilizing QR codes in learning. Lai, Chang, Li, Fan, and Wu (2013) also confirmed that there is a high acceptance level towards QR Code Learning System for teaching among 160 elementary teachers. Thus, it is critical to view the possibility of adopting QR codes in education as its application is still in embryonic stage (Latif et al., 2012).

However, examples of its actual use in education are scarce. In Malaysia, QR codes are relatively new and the awareness of adopting QR codes in learning among the students is still low given that the use of QR code has yet to be studied in Malaysian institution (Latif et al., 2012). Thus, there is a need to create awareness of QR codes among students in Malaysia. Sparse studies had emerged that shed light on QR codes in learning. Latif et al. (2012) also suggested that more researches are required to examine the students' perception in adopting QR codes. Hence, this study is proposed to investigate the determinants that affect the behavioural intention of using QR codes as a learning tool among undergraduate students of private universities in Perak State in Malaysia.

## THEORECTICAL BACKGROUND

UTAUT2 was developed by Venkatesh as an extended model of UTAUT to investigate the acceptance of new technology in a consumer context (Venkatesh, Thong, &Xu, 2012). There are seven main constructs in UTAUT2 model as the drivers of behavioural intention to use information system, which are, performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, price value and habit. Among the seven constructs,four constructs are originated from UTAUT model. UTAUT model was developed by condensing 32 variables across eight models that earlier researches had used to explain user acceptance of new information system in organizational context (Venkatesh, Morris, Davis, & Davis, 2003).

In this study, UTAUT2 model is employed asUTAUT2 proposed the extensions which improved the variance explained in behavioural intention of UTAUT (Venkatesh et al., 2012) while UTAUT was the most powerful theory to measure information systems usage intention before

the appearance of UTAUT2 (Abdul Rahman, Jamaludin, & Mahmud, 2011). Price value and habit will be eliminated from this research due to less relevance with intention to adopt QR codes. QR code readers can be downloaded at no cost and most of them can be used for free (Diazgranados& Funk, 2013; Jackson, 2011). There is no direct cost imposed in the use of QR codes and thus price value is insignificant in this study. The concept of habit is also excluded since experience is a necessity for the formation of habit (Venkatesh et al., 2012). This study is focused on creating awareness of QR codes among learners and the context of experience is not required to be investigated. Additionally, past research conducted by Raman and Don (2013) also showed that habit is insignificant in influencing on behavioural intention use of Learning Management System for academic purposes. It indicates that the concept of habit is insignificant to be investigated in this study.

***Behavioural Intention***

Behavioural Intention is described as the strength of an individual's intention to implement a specified behaviour (Fishbein&Ajzen, 1975). It acts as a determinant of actual usage behaviour (Yi, Jackson, Park, &Probst, 2006) and it is used to evaluate the relative strength of an individual's commitment in the engagement of a particular behaviour (Pickett et al., 2012).In this study, the students' perception towards the use of QR codes as a learning tool is assessed via behavioural intention. It is supported by many previous studies which measured user acceptance through behavioural intention to use (Latif et al., 2012; Lai et al., 2013; Abu-Al-Aish& Love, 2013). As QR codes are still in its early infancy and only less people have experienced using QR codes as a learning tool in Malaysia, behavioural intention plays the role of dependent variable in this research to avoid incorrect inference in this study.

***Performance Expectancy***

Performance expectancy is described as the belief of individual that adopting a technology will aid in job performance. It is formed by five constructs that are perceived usefulness, extrinsic motivation, job-sit, relative advantage and outcome expectations (Venkatesh et al., 2003). Several past studies have shown that performance expectancy has a significant positive influence on the behavioural intention to adopt m-learning (Al-Hujran, Al-Lozi, & Al-Debei, 2014; Nassuora, 2013;Thomas, Singh, &Gaffar, 2013). Al-Hujran et al. (2014) has conducted a survey

on 215 undergraduate and postgraduate students of Al-Faisal University in Saudi Arabia to examine the determinants affecting students' intention to adopt m-learning. The result generated by usingmultiple regression analysis showed that performance expectancy is positively related to the behavioural intention in adopting m-learning. It determined that the expected benefits of using m-learning such as convenience, cost and time reduction have a significant influence on students' intention to use the system. A studyconducted by Latif et al. (2012) based on multiple regression analysis also showed that usefulness has significant positive impact on learners' intention to use QR codes. Based on the findings from the past studies, the hypothesis developed is as follows:

H1: Performance expectancy has a positive relationship on the behavioural intention to adopt QR codes as a learning tool.

***Effort Expectancy***

Effort expectancy can be described as the degree of ease in which an individual think they will obtain when utilizing a technology, also characterizing as perceived ease of use in Technology Acceptance Model (Venkatesh et al., 2003). Prior researches have confirmed that effort expectancy or perceived ease of use is positively associated with behavioural intention to adopt m-learning (Abu-Al-Aish& Love, 2013; Cruz, Boughzala,& Assar, 2014; Poong, 2013). In the context of QR codes adoption, Lai et al. (2013) conducted an experiment and distributed questionnaires to 160 elementary teachers to assess the feasibility and applicability of the QR codes information system. Perceived ease of use of QR codes system was shown to have a significant positive relationship with teachers' enthusiasm to use this system in future has been concluded based on the results generated from multiple regression analysis.According to the past empirical past studies, it was expected that students' perception in adopting QR codes would rely on whether or not the QR codes is easy to use. Thus, the following hypothesis is developed:

H2: Effort expectancy has a positive relationship on the behavioural intention to adopt QR codes as a learning tool.

***Social Influence***

Social influence is the degree to which how people will be influenced by the important others to use a particular technology (Venkatesh et al., 2003). It is characterized as subjective norm in Theory of Reasoned Action (TRA) and Technology Acceptance Model 2 (TAM2) (Venkatesh et al., 2003). Based on past studies, social influence was demonstrated that it has a significant impact on the individual's intention to adopt m-learning as lecturers' acceptance toward m-learning and will motivate students to use m-learning (Abu-Al-Aish& Love, 2013; Tan, Ooi, Sim, &Phusavat, 2012; Wang,Wu, & Wang., 2009). Abu-Al-Aish and Love (2013) have conducted a study to evaluate the determinants affecting the university students' intention to adopt m-learning and there were 183 respondents participated in the survey questionnaires. Structural equation model was used in the study and lecturers' influence was found to have a significant impact on behavioural intention to adopt m-learning. Furthermore, Shin, Jung and Chang (2012) also proved that subjective norms is positively associated with the customers' behavioural intention to adopt QR codes since social influence is critical in the early stage of technology use. Based on the results, the third hypothesis is developed as follows:

H3: Social influence has a positive relationship on the behavioural intention to adopt QR codes as a learning tool.

***Facilitating Conditions***

According to Venkatesh et al. (2003), facilitating conditions refer to the extent of an individual's belief on the availability of technical resources and support for accepting the new technology. It can be explained as the consumers' perspective of the resources and support feasible to conduct behaviour (Brown &Venkatesh, 2005; Venkatesh et al., 2003). Several researchers concluded that facilitating conditions has a positive effect on behavioural intention to use m-learning (Jairak, Praneetpolgrang, &Mekhabunchakij, 2009; Tajudeen, Basha, Michael, &Mukthar, 2013). Iqbal and Qureshi (2012) have conducted a research to investigate students' perceptions about the m-learning adoption among the students of charted universities in twincities of Rawalpindi and Islamabad in Pakistan. Result generated from Ordinary least square regression (OLS) showed that facilitating conditions positively affect the adoption of m-learning. It was revealed that, students will not move towards m-learning adoption in the absence of facilitating conditions.

Similarly, facilitating conditions may also play an essential role in influencing the user's intention to use the QR codes as a learning tool. Thus, the following hypothesis is developed:

H4: Facilitating conditions has a positive relationship on the behavioural intention to adopt QR codes as a learning tool.

***Hedonic Motivation***

According to Brown and Venkatesh (2005), hedonic motivation is characterized as an enjoyment or fun resultant from using an information system. In non-organizational contexts, hedonic motivation was found to be a more significant factor than performance expectancy in determining behavioural intention (Venkatesh et al., 2012). Based on several past studies, perceived playfulness has been found to be a significant positive determinant of the behavioural intention to use m-learning (Gunawardana&Ekanayaka, 2009; Liew, Kang, Yoo, & You, 2013). Chang (2014) has conducted an experiment among 155 auto-repairing students in Taipei and New Taipei Cities to explore the usage of QR code as a social medium in searching and learning professional knowledge of auto-repairing. Asample size of 153 was used in structural equation model to test the hypotheses and the result showed that hedonic value and learning attitude appear obvious positive relationship. It proved that there is a positive relationship between the hedonic value and learning attitude toward QR codes. Students' learning attitude toward QR codes will be higher if they feel about the hedonic value of QR codes. Based on the findings, the hypothesis developed is as follows:

H5: Hedonic motivation has a positive relationship on the behavioural intention to adopt QR codes as a learning tool.

Figure 1: Proposed conceptual framework for the study.

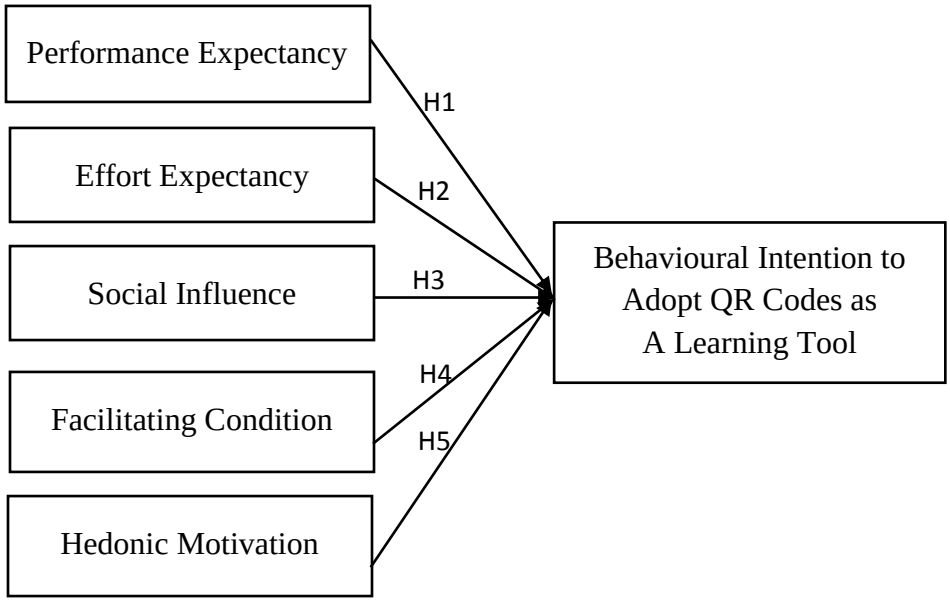


Figure 1: Adapted from Venkatesh et al. (2012). *Consumer Acceptance and Use of Information Technology: Extending the Unified Theory of Acceptance and Use of Technology*. MIS Quartely, 36(1), 157-178.

The proposed conceptual framework in this study is shown in Figure 1. In this study, the dependent variable is behavioural intention to adopt QR codes as a learning tool, in which the variance is attempted to be explained by five independent variables of (1) Performance Expectancy, (2) Effort Expectancy, (3) Social Influence, (4) Facilitating Condition and (5) Hedonic Motivation. The proposed constructs and hypotheses were supported by past empirical studies.

## METHODOLOGY

### *Target Population*

This research was conducted with the undergraduate students of private universities in Perak State in Malaysia. Private universities are selected because nearly half of the undergraduates in Malaysia have enrolled in there (Jamshidi, Arasteh, NavehEbrahim, Zeinabadi, & Rasmussen, 2012). Additionally, private universities also grow rapidly due to limited capacities in the existing public higher education (Arokiasamy&Nagappan, 2012). In this study, Perak State in

Malaysia is selected as it is ranked as one of the top three States in providing highest number of private universities in Malaysia (Department of Higher Education, 2013). It also aspires to be world class education destination which expected to attract students across Malaysia ("SEGiexpand with," 2011). However, sparse literature in educational settings had been focused on Perak. Most of the researches of m-learning studied on Kuala Lumpur and Selangor (Hussin, Manap, Amir, &Krish, 2012; Jambulingam, 2013; Suki&Suki, 2007) as large number of universities are located at there. In this study, non-probability technique which is convenience sampling has been used since there is lack of reliable sampling frame. Self-administered questionnaires were delivered manually to the target population and a total of 275 undergraduate students from UniversitiTunku Abdul Rahman (UTAR), Universiti Kuala Lumpur Royal College of Medicine Perak (UNIKL RCMP) and UniversitiTeknologiPetronas (UTP) in Perak State in Malaysia participated in this study.

***Measurement***

All independent and dependent variables in this research were measured by using items mainly adapted from Venkatesh et al. (2012) as the proposed conceptual framework is adapted from UTAUT2 model with minor modifications. The 25 items in the survey questionnaire were adapted from Venkatesh et al. (2012). They were tested by using an interval scale with range from 1=Strongly Disagree to 5=Strongly Agree in five-point Likert scale as proposed by RensisLikert.

In this study, self-administered questionnaires have been distributed to 300 undergraduate students of three selected private universities which are UTAR, UNIKL RCMP and UTP and only 275 were usable.

**RESULTS**

***Demographic Profile of Target Respondents***

Table 2: Summary of Demographic Profile

| Profile | Category | Frequency | Percentage |
|---|---|---|---|
| Gender | Male | 117 | 42.55 |
| | Female | 158 | 57.45 |

| | | | |
|---|---|---|---|
| Age | 18-20 | 121 | 44.00 |
| | 21-24 | 147 | 53.45 |
| | Above 24 | 7 | 2.55 |
| Race | Malay | 92 | 33.45 |
| | Chinese | 139 | 50.55 |
| | Indian | 35 | 12.73 |
| | Other | 9 | 3.27 |
| Current Education Pursued | Foundation | 15 | 5.45 |
| | Diploma/Advanced Diploma | 47 | 17.10 |
| | Degree/Professional Qualification | 213 | 77.45 |

Source: Developed for the research

This section portrays the demographics and other personal background information. Majority with 158 respondents are female (57.45%) and the remaining are male (42.55%). Data collection exhibits that most of the respondents aged from 21 to 24 (53.45%), followed by 18 to 20 (44.00%) and above 24 (2.55%). The largest ethnic group taken part is Chinese (50.55%), followed by Malay (33.45%), Indian (12.73%) and other races (3.27%). Majority of the respondents are pursuing degree or professional qualification (77.45%) and few of the respondents are from foundation (5.45%). The remaining respondents are pursuing diploma or advanced diploma (17.10%).

***Measurement and Reliability***

Table 3: Central Tendencies Measurement and Reliability Statistic of Construct

| Variables | Average Mean | Average Standard Deviation | Cronbach's Alpha | No. of Items |
|---|---|---|---|---|
| Performance Expectancy | 3.08000 | 0.76979 | 0.89688 | 4 |
| Effort Expectancy | 3.39818 | 0.75127 | 0.84082 | 4 |
| Social Influence | 3.16545 | 0.75750 | 0.83730 | 4 |
| Facilitating Conditions | 3.23182 | 0.74275 | 0.84798 | 4 |
| Hedonic Motivation | 3.35091 | 0.81950 | 0.92518 | 4 |
| Behavioural Intention | 3.17091 | 0.77744 | 0.89961 | 5 |

Source: Developed for the research

Based on Table 3, effort expectancy has the highest average mean and performance expectancy has the lowest average mean. Meanwhile, variable with highest average standard deviation is hedonic motivation whereas facilitating conditions has the lowest average standard deviation. Among all the variables, hedonic motivation has the highest reliability with Cronbach's Alpha of 0.92518 while social influence scores the lowest Cronbach's Alpha value of 0.83730. In overall, all variables are deemed to be good and highly reliable as the Cronbach's Alpha of each variable exceed 0.8 (Hair,Celsi, Money, Samouel, & Page, 2011).

***Hypotheses Testing***

Table 4:Summary of Inferential Analysis

| **Hypotheses** | **Pearson Correlation** | **Multiple Linear Regression (R-Square = 0.6232) (F Value = 89.00) (P-value = <.0001 )** | | |
|---|---|---|---|---|
| | **Result** | **Beta** | **P-value** | **Hypothesis** |
| **$H_1$**: Performance expectancy has a positive relationship on the behavioural intention to adopt QR codes as a learning tool. | 0.63996 | 0.15034 | 0.0095 | Supported |
| **$H_2$**: Effort expectancy has a positive relationship on the behavioural intention to adopt QR codes as a learning tool. | 0.63102 | 0.12078 | 0.0375 | Supported |
| **$H_3$**: Social influence has a positive relationship on the behavioural intention to adopt QR codes as a learning tool. | 0.67968 | 0.27039 | <.0001 | Supported |
| **$H_4$**: Facilitating conditions has a positive relationship on the behavioural intention to adopt QR codes as a learning tool. | 0.55591 | 0.13084 | 0.0095 | Supported |

| | | | | |
|---|---|---|---|---|
| **$H_5$**: Hedonic motivation has a positive relationship on the behavioural intention to adopt QR codes as a learning tool. | 0.68001 | 0.28707 | <.0001 | Supported |

Source: Developed for the research

According to Table 4, result of Pearson Correlation illustrates that all independent variables are positively and moderately associated with dependent variable. Additionally, there is no multicollinearity problem as the correlations between the variables are below the level of 0.90 (Hair, Bush, &Ortinau, 2006). The p-value for all independent variables is less than 0.05, which indicates that all independent variablessignificantly influence the dependent variable. Hence, all developed hypotheses are supported. Besides, the R-square of 0.6263 from Multiple Linear Regression test indicates that 62.63% of the dependent variable can be explained by the five independent variables.

Based on the outcomes, the equation is being created as:

**BI = 0.05672 + 0.15034 (PE) + 0.12078 (EE) + 0.27039 (SI) + 0.13084 (FC) + 0.28707(HM)**

The above mentioned equation shows that hedonic motivation (β = 0.28707) is the most effective factor while effort expectancy (β = 0.12078) is found as the least effective factor. All the independent variables have significant positive relationship with the dependent variable.

## DISCUSSION

In line with past studies, the results revealed that all independent variables which are performance expectancy, effort expectancy, social influence, facilitating condition and hedonic motivation have a positive relationship on the behavioural intention to adopt QR codes as a learning tool. QR codes render greater mobility in learning and it may help to improve the learning and academic performance of the students. Students will tend to use QR codes as a learning tool when they find QR codes are useful to their studies. Latif et al. (2012) concluded that usefulness has significant positive impact on learners' intention to continue using QR codes for learning. In this study, performance expectancy achieved a significant value of p-value < 0.05 and beta value of 0.15034 which shows that there is positive relationship with behavioural intention.

The results in this research showed that effort expectancy has a positive relationship on the behavioural intention to use QR codes as a learning tool. QR codes are still in infant stage and its adoption in learning is low in Malaysia (Latif et al., 2012). However, it has a positive relationship on the behavioural intention to use QR codes as a learning tool as effort expectancy will be a factor of behavioural intention to use particularly towards those users with little experience in utilizing information technology (Venkatesh et al., 2003).

As the results illustrated, social influence has a positive relationship on behavioural intention in adopting QR codes as a learning tool. Abu-Al-Aish and Love (2013) illustrated that lecturers play a vital role in influencing students to apply new technologies in learning system. More willingness would be given by the students in adopting new technologies when it is motivated by lecturers. Besides, Wang et al. (2009) further explained that students may begin to convince others to adopt new technology system when getting familiar with the system. In short, students are more willing to use new technology such as QR codes in their learning if they are encouraged by others.

Facilitating conditions has a significant value of $p<0.05$ and beta value of 0.13084 which revealed that facilitating conditions is positively related with behavioural intention to use QR codes as a learning tool. Facilitating conditions such as hardware, software, and Internet speed are very important for QR codes adoption. In the absence of facilitating conditions,students will not move towards QR codes adoption.Jiin, Hao and Yu (2012) hasconcluded that facilitating conditions has significant relationship on the intention to adopt the QR codes. With the ubiquity growth of mobile devices, mobile phones are capable to read QR codes. The software of QR codes is freely available and its applications can be downloaded easily from internet. These developments have contributed to the growing of QR codes and it affected the behavioural intention to adopt QR codesas a learning tool.

In this study, hedonic motivation is found to have the strongest relationship with the behavioural intention to adopt QR codes as a learning tool. Hedonic characteristics of digital learning system play a significant role in affecting behavioral intention to adoptit since individuals who experience enjoyment from using a technology are more likely to use it extensively (Wang et al.,

2009). Several past studies concluded that perceived playfulness has a positive relationship on behavioural intention to adopt m-learning (Gunawardana&Ekanayaka, 2009; Wang et al., 2009) and this result may due to the factor that m-learning system is enjoyable to be used. Since scanning an interesting looking tiny square is an exciting way to obtain information, students will learn QR codes and intend to use it. Hence, hedonic motivation has the strongest relationship among all the independent variables.

**IMPLICATION OF STUDY**

Managerial implications in this research provides an in depth study on the determinants affecting behavioural intention to adopt QR codes as a learning tool among undergraduate students of private universities in Perak State in Malaysia. It benefits the educators, administrators and managements of private universities since digital learning has become a key attribute of the future education systems. By using this research as a source of reference, they are able to understand which features of QR codes are crucial throughout the students' learning process. In addition, this research also provides information about a new technological and innovative teaching method which is using QR codes as a pedagogical tool to the universities. The initiative of educators in using QR codes as their teaching tools is one of the important determinants in affecting students' intention to adopt it. With the increase popularity of QR codes, it is possible to implement QR codes as a learning tool since students' intention towards it is relatively high.

Besides, theoretical implications in this study had validated the modified version of UTAUT2 model for the QR codes in educational context. The results indicated that 62.32% of the variance in behavioural intention is jointly explained by all the five independent variables and all the hypotheses are supported. It has further served as a foundation and thus provided a valuable contribution in UTAUT2 to understand the behavioural intention of the undergraduate students of private universities towards QR codes as a learning tool specifically in Perak, Malaysia. Additionally, it has become one of the first few empirical studies using UTAUT2 model to examine the drivers influencing the students' behavioural intention to adopt QR codes as a learning tool in Malaysia.

## LIMITATION AND FUTURE RESEACH

There are some limitations are existed in the path of completing this research. Firstly, target population of this research is onlyundergraduate students of private universities in Perak State which may not be able to represent the views of all undergraduate students inMalaysia. Additionally, more female respondents participated in this research may cause the existence of over representative of female group in this research. It is recommended to the future researchers to include other geographical areas and balancing the number of male and female participants in order to prevent over-representation.

Secondly, data collection method used was closed-questions structure questionnaires that limited to the "suggested answers" and participants are unable to express their actual opinions. Hence, future researchers could set open-questions structure questionnaires and diversify data collection method such as interview. Actual views and feelings could be obtained through open-questions structure questionnaires and interviewing.

Thirdly, only five independent variables were examined and selected variables were only capable to describe 62.32% of the behavioural intention to use the QR codes as a learning tool. This indicates that there is a limitation in selecting variables to explain the determinants. Future researchers could incorporate more determinants to strengthen the explanatory of the behavioural intention to adopt QR codes as a learning tool such as self-efficacy and personal innovativeness.

Lastly, this research is a cross-sectional study which only a snapshot for a phenomena at a particular time (Saunders, Lewis, &Thornhill, 2009). Findings generated might be pointless as the nature of the human will always change from time to time. Therefore, longitudinal study approach is strongly recommended as the data collected may give a valuable info and powerful insight into developments in respondents' behaviour change over a period (Saunders et al., 2009).

## CONCLUSION

With the ubiquity growth of mobile devices, the implementation of QR codes has offered a new dimension in education. It is important to study in depth in all aspects of QR codes since QR codes is believed to become an excellent educational tool for future teaching and learning

processes. The findings showed that all selected independent variables were found to have a positive relationship on the behavioural intention to adopt QR codes as a learning tool among undergraduate students of private universities in Perak State. This research may contribute to create awareness and to broaden the knowledge for the education industry to understand students' intention towards QR codes. Through the findings of this research, the educators, administrators and managements of private universities are able to understand the determinants that influence students' intention before investing in and implementing QR codes as learning tool. Additionally, it will also help them to develop a better user accepted digital learning systems to students. In conclusion, this research can be used as future reference for supporting the development of QR codes as a learning tool.

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