Journal of Global Business and Social Entrepreneurship (GBSE)
Vol. 5: No. 14 (March 2019) page 11-21 | www.gbse.com.my | eISSN : 24621714

A QUESTIONNAIRE-BASED APPROACH ON TECHNOLOGY ACCEPTANCE MODEL FOR MOBILE DIGITAL GAME-BASED LEARNING

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Abstract: *There is an ongoing debate among researchers and education on whether traditional teaching methods is still relevant in this era. It is argued that such methods do not gauge students' interest towards learning and consequently create low quality of learning and negative trends. In this regard, researchers have advocated the use of digital games as an effective medium for learning. It is also argued that the use of digital games can positively influence the learner's motivation and help facilitate early intervention. In this study, we used elements in the Technology Acceptance Model (TAM) to investigate the users' acceptance towards the use of mobile digital games for learning Arabic language in the context of higher education. The quantitative approach based on the Technology Acceptance Model questionnaire was used as this study's primary research methodology. The exanimation focused on four related constructs, Perceived of Usefulness (PU), Perceived Ease of Use (PE), Behavioural Intention to Use (BI) and Attitude (AT), which were modified to suit the study's context. This study also provides a detailed description of each construct and its relevance toward the issue being studied. This study has presented several approaches that could be employed to check whether digital games could be used as part of teaching and learning in tertiary education. Furthermore, this study investigated how the use of digital games achieves the aims and objectives of the design.*

Keywords: *Digital game, Game Application, Mobile Technology, Arabic Language Learning, Teaching and Learning, Technology Acceptance Model, Higher Education Sector*

2019 JGBSE

Introduction

In today's globalised world, the introduction of the latest technological advances has pushed to introduction of novel, innovative teaching approaches to replace conventional language learning methodology. The advent of the internet and computer technology has expanded the

possibilities of teaching and learning process especially for Arabic language. Technology provides teachers with access vast to resources and opportunities, including new language teaching and learning tools, approaches, and strategies. In the meantime, despite learning Arabic as a subject in primary and secondary school, a huge number of students in Malaysia are still unable to master Arabic. Awang et al., (2013) stipulated that students do not have the confidence to use Arabic both inside and outside of the classroom. According to Teh et al (2009), students' lack of proficiency in Arabic language has created a great concern over the quality of Arabic teaching and learning in Malaysian schools. Moreover, researchers like (Sardi, 2017) also claimed that the present pedagogical system does not provide students with the sufficient opportunity to master the necessary language skills. As result, students feel demotivated and do not want to participate actively in the classroom. Thus, Noor et al., (2016) posited that to encourage the students to learn Arabic language, teachers should introduce interesting learning strategy such as independent and active learning through the use of electronic materials (Samah, 2017).

Digital games can become a form of educational intervention that can positively influence active learners and motivate to participate actively in the classroom. These games are deemed as an effective tool which could encourage learning among digital natives. Numerous scholars, such as Alessi & Trollip, (1984), Baid & Lambert, (2010), Kirikkaya et al., (2010), Sahrir, (2011) and Hamizul & Rahimi, (2015) have advocated that digital games can become a good learning tool to motivate students to actively participate in teaching and learning activities Moreover, studies have shown that the use of digital games could improve student's knowledge, create a conducive learning environment, increase students' engagement throughout learning the process, as well as develop soft skills such as leadership and decision making (Paiva et al., 2016; Sung & Hwang, 2013; Hwang et al., 2012; Najdi & Sheikh, 2012; Lee, J & Hammer, 2011) (Yien et al., 2011; Papastergiou, 2009).

To fulfil this study's objectives, a questionnaire based on the Technology Acceptance Model (TAM) was prepared to investigate students' level of acceptance towards the use of a mobile digital game for learning Arabic language in higher education. There are four variables being studied, perceived usefulness, perceived ease of use, attitude and behavioural intention to use. Tests on Reliability and content validity were performed to ensure the validity and consistency of the items in the questionnaire.

Theoretical Framework

Instructional technology scholars have introduced numerous theoretical perspectives to improve understanding on how end users make decisions to use certain technologies. In this regard, the most common theories on technology application include Theory of Planned Behaviour (TPB) (Fishbein & Ajzen, 1975), Technology Acceptance Model (TAM) (Davis, 1989), Innovation Diffusion Theory (IDT) (Rogers, 1995), and the Unified Theory of Acceptance and Use of Technology (UTAUT) (Ventakesh et al., 2003; Ventakesh et al.,2012). These theories have been used as tools to understand the success or failure of technology application.

One of the most popular model of technology acceptance is the TAM model. It was introduced as an extension for the Theory of Reason Action (TRA) (Ajzen & Fishbein, 1980), hence, it contains some elements of the TRA to explain why a user accepts or rejects the use

of information technology. The TAM model presents two cognitive beliefs, perceived usefulness and perceived ease of use. It posits that a user's actual use of information technology is influenced by aspects such as their behavioural intentions, their perceived usefulness of the system, attitude, and perceived ease of use of the system. Thus, TAM is considered as the best model to help increase understanding users' acceptance of e-learning (Park, 2009; Bourgonjone et al., 2010) and predict users' behaviour towards the use of information technology (Legris et al., 2003).

As mentioned, TAM determines the users' acceptance of technology, perceived of usefulness, and perceived ease of use; in this light, perceived of usefulness reflects the extent of an individual's belief on how a system could enhance task performance. Meanwhile, perceived ease of use reflects the extent of an individual belief that the use of a system is easy and without the need for any strenuous physical and mental effort (Davis, 1989). In addition, TAM posits that one's attitude, perceived of usefulness and perceived ease of us directly determine his/her intention to accept technology. Another important construct in TAM is individuals' intention to use technology. It is stipulated that behavioural intention is influenced by attitude and such intention determines one's actual use of a technology (Davis, 1989; Ventakesh et al., 2012). The figure below conceptualises the constructs in the TAM model.

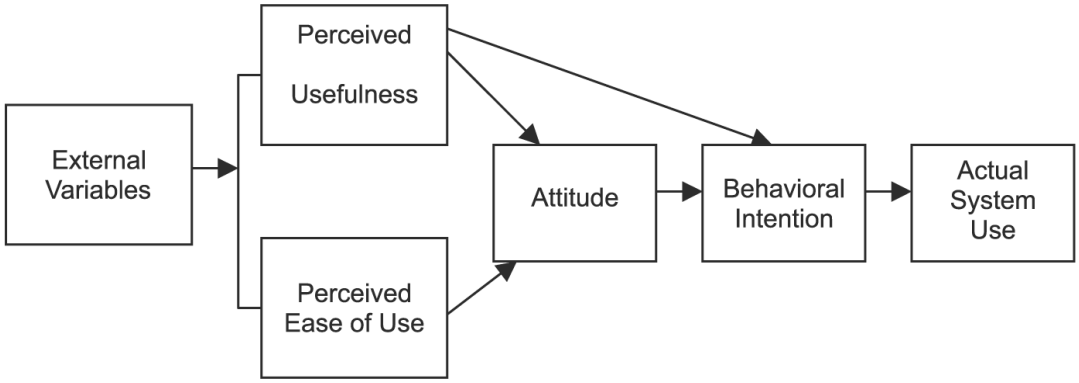

Figure 1: Technology Acceptance Model

Over the years, TAM, as a theory has evolved; Technology Acceptance Model 2 (TAM2) was introduced by called (Ventakesh & Davis, 2000). TAM 2 is different from the original TAM as the newer model does not include the element of 'attitude' despite it is deemed as a mediator for the impact of perceived of usefulness and perceived ease of use. Furthermore, TAM2 presents an extended model of the original TAM which incorporates other theoretical constructs including experience, social influence processes (subjective norm, voluntariness and image), cognitive instrumental process (job relevance, output quality, and result demonstrability). The figure below illustrates the constructs in the TAM model.

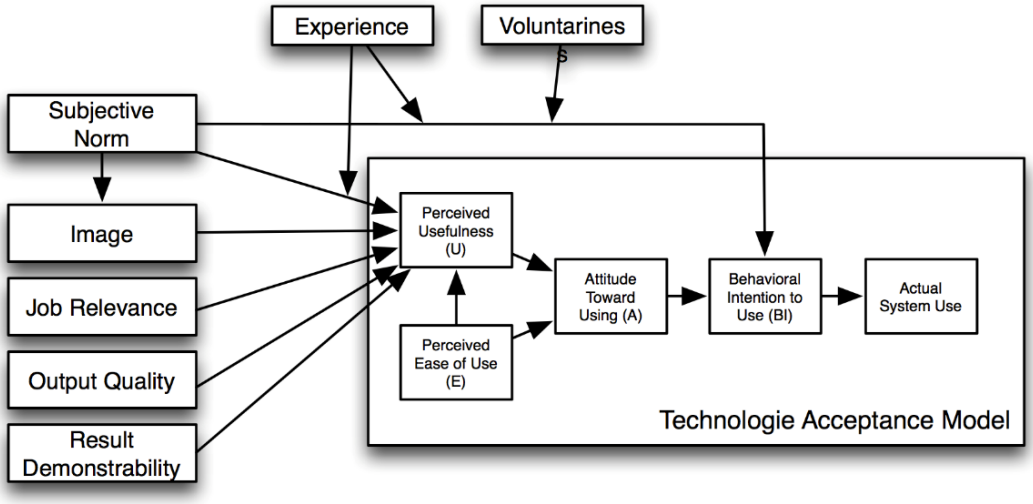

Figure 2: Technology Acceptance Model 2

Another version of TAM is the Technology Acceptance Model 3 (TAM3) which is a combination of TAM2 and the determinants of perceived ease of use (Ventakesh & Bala, 2008). TAM3 highlights four constructs individual differences, system characteristics, social influence and facilitating conditions which determine the perceived of usefulness and perceived ease of use. According to the TAM3 model, a user's experiences moderate perceived ease of use to perceived usefulness, computer anxiety to perceived ease of use and perceived ease of use to behavioural intention. The figure below shows the constructs in the TAM 3 model.

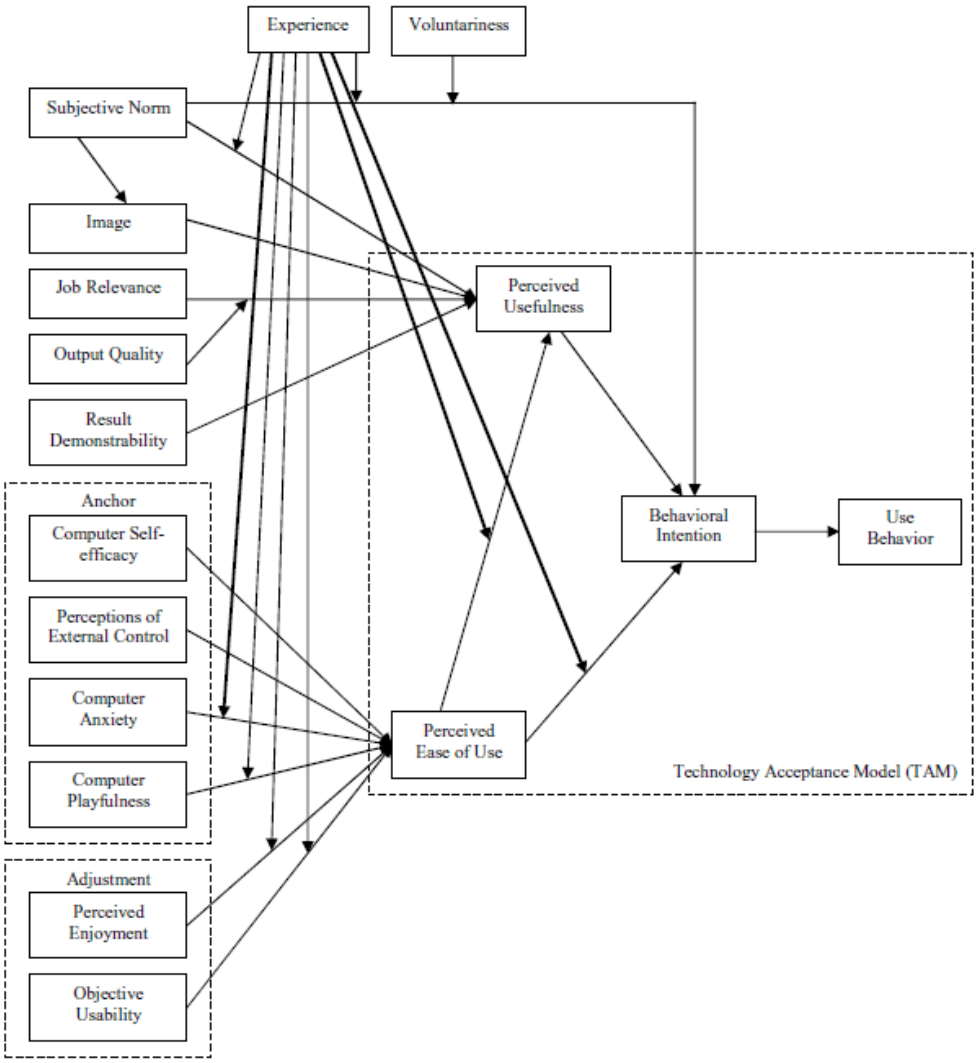

Figure 3: Technology Acceptance Model 3

Methodology

This study employed the quantitative approach. According to Creswell (2011), the use of the quantitative approach helps describes the trends in a population or describes the relationships among the study's variables. The primary data for study were collected through a survey questionnaire. A Likert Scale was used for the items in the questionnaire. The Likert scale is a common way to examine the extents of the respondents' agreement on the statements given in the questionnaire. For this study, a 5 point Likert scale was used. The scale was anchored by (1) Strongly disagree, (2) Disagree, (3) Nature, (4) Agree, (5) Strongly agree. To fulfil the study's objective of examining the variables in the adoption model and to evaluate the use of a digital mobile game for learning Arabic language skills, the data from the questionnaire were analysed quantitatively. Prior to distributing the questionnaire, a pilot test was conducted in order to test the reliability of the instrument. The researcher also consulted five Subject Matter Experts (SMEs) from various public universities in Malaysia to validate the items in the instrument.

Sampling
The study involved 40 Universiti Malaysia Kelantan (UMK) undergraduate students who were enrolled in an Arabic language course. Purposive sampling was used as data were collected from a specific group of samples with a common trait, in this case, UMK students who are taking Arabic language course.

Analysis Technique
There are three objectives for implementing the data analysis: (1) to analyse the data obtained from the sample (2) to test the goodness of data (3) to validate the proposed hypothesis.

Variable Measurement
The main objective of this study to evaluate the respondents' acceptance towards the use of a mobile digital game for learning Arabic. The questionnaire comprises two sections, section A which probes the respondents' demographic information, meanwhile Section B contains 20 items which examines the constructs of TAM, which are perceived of usefulness, perceived ease of use, attitude and behavioural intention to use.

Result and Analysis

This study has developed a research instrument for investigating users' acceptance towards the use of mobile digital game for learning Arabic language in a higher education setting. The main theory used in this study is the TAM model which posits that the elements of perceived usefulness, perceived ease of use, attitude and the behavioural intention to use technology are related to users' acceptance towards the use of mobile digital game for learning Arabic language in a tertiary institution.

Perceived Usefulness

Perceived usefulness refers to user's perception on whether using technology, in this case, a mobile digital game, could improve their performance. Perceived of usefulness is influenced by other elements particularly the perceived ease of use. This is because user will be inclined to choose tools that are easy to use and require minimal physical and mental effort to solve a problem. At the same time, perceived ease of use and perceived usefulness influence users' behavioural intention or the actual use of technology. For this study, perceived usefulness was measured through five items. These items were developed to suit the context of this research. These responses for these five items are tabulated in the table below.

Construct	Operational Definition	Measured Items
Perceived Usefulness (PU)	Perceived usefulness reflects students' perception on whether the use of the mobile digital game will enhance their performance	**PU1**: The educational digital game will improve my learning performance. **PU2**: The educational digital game will increase academic productivity. **PU3**: The educational digital game could make it easier to study course content. **PU4**: The educational digital game will enhance the effectiveness of learning. **PU5**: I find the educational digital game useful.

Table 1: Perceived of Usefulness Items

Perceived Ease of Use

Perceived ease of use denotes how students perceive that the use of a mobile digital game for learning Arabic only require minimum effort. Previous studies have reported that students will interact with a mobile digital game when they think that its use requires minimum effort from them. For this study, perceived ease of use construct was measured through 6 items which were designed to fit the context of this study, as shown in the table below.

Construct	Operational Definition	Measured Items
Perceived Ease of Use (PEU)	Perceived ease of use refers to a student's perception that using a mobile digital game for learning Arabic will require minimal effort.	**PEU1**: I find the educational digital game is easy to use. **PEU2**: Learning how to use the educational digital game is easy for me. **PEU3**: It is easy to become skilful in using the educational digital game. **PEU4**: My interaction with the educational digital game is clear. **PEU5**: My interaction with educational digital game is understandable. **PEU6**: It will be easy for me to find information through the educational digital game.

Table 2: Perceived Ease of Use Items

Attitude

Attitude denotes how students evaluate and judge the target behaviour according to certain dimensions, such as harmful or beneficial, good or bad, and pleasant or unpleasant. Attitude was measured through five items developed based on the context of this study. These items are as follow.

Construct	Operational Definition	Measured Items
Attitude (AT)	Attitude refers to student's judgement on whether the use of the mobile digital game is beneficial to them.	**AT1**: Studying using the educational digital game is a good idea. **AT2**: I feel positive towards the use of the educational digital game. **AT3**: I believe that the educational digital game helps to be more engaged in learning. **AT4**: I generally favour the use of the digital game for learning. **AT5**: I believe that it is a good idea for me to use this educational digital game for my future coursework.

Table 3: Attitude Items

Behavioural Intention to Use

Behavioural intention to use depicts one's intention to actually perform a behaviour. This intention is highly influenced by perceived usefulness and perceived ease of use. In this study, behavioural intention in question is the users' intention to use the mobile digital game for learning Arabic language at present and in the future. This construct is measured through four items developed to fit the study's context. These items are as follow.

Construct	Operational Definition	Measured Items
Behavioural Intention to Use (BI)	Behavioural intention refers to one's an students' intention to actually use the mobile digital game for learning Arabic language at present and in the future	**BI1**: I intend to frequently use the mobile digital game to practice vocabulary. **BI2**: I intend to use the educational digital game heavily . **BI3**: I intend to use educational digital game throughout this semester and the next. **BI4**: I intent repetitively use the educational digital game as often as possible.

Table 4: Behavioural Intention to Use Technology

Reliability

This study also conducted a reliability analysis to ensure the internal reliability consistency of the items used in the questionnaire. According to Pallant (2007), for an item to be reliable, the Cronbach's Alpha coefficient for the scale should be 0.70 and above which indicate that the items are homogeneous and the measure the same constant. The results of the reliability tests for the measurement scales are shown below. As the Cronbach's alpha reliability scores for all of the constructs exceed 0.75, it can be deduced that all of the items for each construct have a considerably good reliability (Nunnally, 1978), hence, the questionnaire is a reliable measurement instrument.

Construct	Cronbach's Alpha	No. of Item
Perceived Ease of Use (PEU)	0.818	6
Perceived of Usefulness (PU)	0.870	5
Attitude (AT)	0.846	5
Behavioural Intention to Use (BI)	0.757	4

Table 5: Cronbach's Alpha Coefficient

Validity

To determine the validity of the items in the questionnaire, Five Subject Matter Experts (SMEs) were also consulted to validate and evaluate the items in the research instrument. The SMEs consists of experts in the field of instructional technology and Arabic as a second language from different Malaysian universities in Malaysia. Some of the items were amended according to opinions and suggestions given by the SMEs.

Conclusion

It is imperative for educators and researchers to examine students' acceptance towards the use of a mobile digital game for learning Arabic specifically in the tertiary education setting. This study will provide valuable input to the literature on the use of mobile digital game and digital game-based learning which are still in the infancy stages (Sahrir, 2011; Hamizul & Rahimi, 2015). Furthermore, focusing on the use of digital games for learning Arabic language field will garner more interest from researchers and educators as studies on Teaching Arabic as a second Language has slowly gained momentum. At the same time, there is a blossoming interest towards the incorporation of technology in the Malaysian education setting due to its has potential for promoting active learning, developing thinking skill, and providing an interactive platform for second or foreign language learning.

Based on the above argument, it is posited that designing a Technology Acceptance Model based instrument specifically to examine students' acceptance towards the use of mobile digital games in higher education sector is the first step in developing a more efficient teaching and learning in the Malaysian education context. This study documents the development of a research instrument to investigate user acceptance towards the use of a mobile digital game for learning Arabic language based on Technology Acceptance Model (Davis, 1989). TAM model, which features four constructs, perceived of usefulness, perceived ease of use, attitude, and behavioural intention, is the underlying theory for this study. The primary data for this study were collected through a questionnaire with 20 items on the four aforementioned constructs. The items in the questionnaire went through reliability and validity tests to ensure that they are reliable and valid for this study.

One limitation of this study is that it did not include any actual system use in the research model. Therefore, future study could include all of the TAM variables. Moreover, future studies could evaluate whether mobile digital games are effective learning tool and could improve student's performance and motivation through the use of the experimental method. Lastly, there is need to re-examine the TAM model as a way to ensure the validity of the instrument. This could be done through using new user population to obtain the reliability, content validity, and construct validity of the instrument.

Acknowledgement

The researchers would like to acknowledge the Research Management Innovation Complex (RMIC) Universiti Pendidikan Sultan Idris for funding through Geran Penyelidikan Universiti (GPU) 2018.

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