ISSN: 0975-833X

Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 12, Issue, 07, pp.12361-12370, July, 2020

DOI: https://doi.org/10.24941/ijcr.38841.07.2020

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

RESEARCH ARTICLE

INVESTIGATING STUDENTS' ACCEPTANCE OF AND MOTIVATION TO USE TABLET COMPUTERS FOR LEARNING IN HIGHER EDUCATION

***Dr. Azza Alomary**

BSc. English Langugae, MSc. & PhD. Educational Technology, Saudi Arabia

ARTICLE INFO

Article History:
Received 21st April, 2020
Received in revised form
30h May, 2020
Accepted 07th June, 2020
Published online 28th July, 2020

Key Words:
Higher Education, Mobile Learning (m-learning), Motivation, Tablet Computers, Technology Acceptance

ABSTRACT

Mobile learning (M-learning) can play an important role in the development of teaching and learning methods for higher education. Nevertheless, the successful implementation of m-learning in higher education will be dependent on users' acceptance of this technology. Therefore, the purpose of this study is to investigate students' attitudes towards using tablet computers in learning through exploring factors that influence students' motivation to use and their acceptance of tablet use in learning. The study develops a new model which integrates the original technology acceptance model (TAM) with self-determination theory (SDT), and names it *Motivation and Acceptance of Learning with Tablet* (MALT). The model is developed based on students' perspectives gathered via 303 online questionnaires. Exploratory and confirmatory factor analyses as well as structural equation modelling are used to analyse the questionnaire. The key finding of this study is that there are five factors named perceived enablers, perceived image, perceived enjoyment (intrinsic motivation), perceived usefulness (extrinsic motivation) and behavioral intention. Perceived enjoyment is the strongest predictor in the MALT model. There are two moderating variables which are access and teacher support in the MALT model.

Citation: ***Dr. Azza Alomary.*** **2020.** "Investigating Students' Acceptance of And Motivation To Use Tablet Computers For Learning In Higher Education", *International Journal of Current Research*, 12, (07), 12361-12370.

INTRODUCTION

Over the past decade, education systems in general and higher education (HE) in particular have seen transformations because of the development of information and communication technology (ICT). The conventional 'chalk and talk' method of lecturing in public and private universities in Kingdom of Saudi Arabia has gradually been supplemented by technology-enhanced teaching/learning processes (Al-Qirim, 2011; Al-Wabil, 2015; Almarwani, 2011; Gursul & Tozmaz, 2010; Martin *et al*., 2011). One of the forms of technology-enhanced learning is mobile learning (m-learning). Williams and Pence (2011), in their study of the role of technology in chemistry teaching, found that smart phones can enhance learning, and Moran *et al*. (2010) concluded that using tablet computers in higher education was very effective. However, on the whole, it is evident that a clear picture of m-learning affordance and effectiveness has yet to be obtained. M-learning might play an essential role in the development of teaching and learning processes in higher education (Ali, 2012). However, the successful implementation of m-learning in higher education is reliant on users' acceptance of this kind of technology.

****Corresponding author:*** **Azza Alomary**
BSc. English Langugae, MSc. & PhD. Educational Technology, Saudi Arabia

Amongst mobile devices and other technologies, researchers agree that tablet computers are useful tools for educational purposes and that it can be used very effectively to enhance student learning and interaction, and to increase student motivation and engagement (Fischer *et al*., 2013; Kothaneth *et al*., 2012; Mohseni, 2014). The tablet computer has recently become a very popular tool in education. The Apple iPad, launched in 2010, was the initial market leader in tablet technology, and since then other manufacturers including Samsung, Motorola, Lenovo, Toshiba, Acer and Asus have been quick to launch their own tablets with Google's mobile operating system, Android. Motion's Blackberry Playbook and HP's TouchPad are also in the category of "tablet". Against the fixed type of ICT tools, the mobile technologies are better able to enhance and support learning, a fact which has proved attractive to the current generation of students because they are easier and faster.

Related Literature

Mobile learning(m-learning): M-learning refers to personalised learning which refers to the users' own device by wireless technology handheld devices at the learner's own pace, any place, anytime and on any subject with a degree of privacy (Narayanasamy & Mohamed, 2013 & Nassuora,

2012). It can make learning truly personalised in that learners use their own devices as one-to-one interaction, have the option to choose content depending on their interests, so that pedagogy is changing from a teacher-centric to a learner-centric approach with m-learning. It is considered as a subset of e-learning or as the next generation of e-learning(Behera, 2013 &Ma & Yuen, 2011). The limited battery life of mobile devices, the cost of these devices and adequate support from educational institutions are considered as limitations in the adoption of m-learning in HE(Alsaadat, 2009). However, m-learning can provide an opportunity for the new generation of students to enjoy better communication and learning activities without taking into account place and/or time.

Tablet computer: Researchers agree that the tablet is a useful tool for educational purposes and that it can be used very effectively to facilitate student learning and interaction(Fischer *et al*., 2013; Kothaneth *et al*., 2012; Mohseni, 2014). Thus, the tablet may well become the main device used in learning and classroom environments in the near future, although studies show that the adoption of tablets in HE is not guaranteed to be successful. Tablets support access to many kinds of information and mobile applications and possess advantages for collaborative learning. However, these devices could also distract students and create frustration in the classroom(Ali, 2012). On the other hand, if tablets are incorporated into the classroom carefully and reflectively, educators can maximise their potential to enhance learning and minimise obstacles with learning.

Theoretical frameworks: The original Technology Acceptance Model (TAM). Investigating learners' acceptance of m-learning is important (Liaw & Huang, 2011). Acceptance of technology to support student learning is premised by professed beliefs which lead to intentions, and these will be followed by planned behaviour (Moran *et al*., 2010). Thus, in order to know whether students accept or reject the use of tablets in their learning and to explore the factors that influence students to adopt the use of tablets, the original technology acceptance model is considered in this study.

Fred Davis developed the TAM first in 1986 in his doctoral study (Davis *et al*., 1989). The TAM originated as an adaptation of the more generalised theory of reasoned action (TRA) and was developed more specifically later to predict and explain technology usage behaviour (Davis *et al*., 1989; Davis, 1989). TAM is "helpful not only for prediction but also for explanation". (Davis *et al*., 1989:985). Therefore, it is a very helpful model for researchers.

The TAM was developed by Davis in 1989 to identify the factors which lead users to accept or reject a technology by integrating the technological aspects and the organisational behaviour concepts (Davis *et al*., 1989; Davis, 1989). According to the TAM, while there are several factors affecting users' acceptance of a technology, the two most important are perceived usefulness and perceived ease of use (Davis, 1989). Perceived usefulness refers to the improvement that can be expected in task performance with the aid of the technology, and perceived ease of use refers to the perceived easiness of using the new technology (Davis *et al*., 1989). So, the TAM has used the TRA as a theoretical basis to find the links between these two factors as well as the user's attitude, intention and actual technology behaviour **Figure 1**.

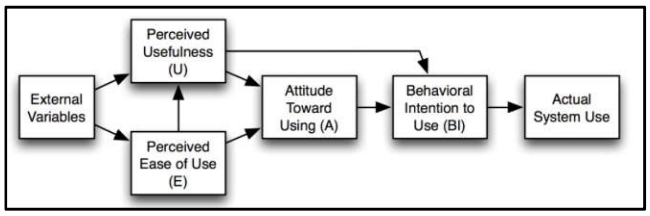

Figure 1. Technology acceptance model (TAM) (Davis et al., 1989) Self-Determination Theory (SDT)

Table 1. The constructs' names, codes and definitions

Variable name	Code	Definition
Behavioural intention	BI	The learner's behavioural intention to use a tablet for learning.
Perceived enjoyment (intrinsic)	PEJ	The degree to which learners perceive that they have fun when using a tablet for learning.
Perceived image	PIM	The degree to which learners perceive that the use of a tablet for learning is a means of enhancing their status among their social groups.
Perceived enablers	PEN	The degree to which learners perceive that tablet facilities (ease of use and mobility) and self-facilities (personal self efficacy) enable them to use tablets for learning.
Perceived value (extrinsic)	PV	The degree to which learners perceive that using a tablet for learning is valuable.
Access	ACC	The Internet access when using a tablet for learning.
Teacher support	TS	The teacher supports and encourages learners to use tablets for learning.

SDT has encouraged a great deal of research on aspects of motivation in education (Brophy, 2010) and is used in the study of motivation associated with internal processes (Maehr, 1984). Moreover, it is one of the most comprehensive and empirically supported theories of motivation which is available today and has important implications for educational practice (Pintrich & Schunk, 2002). Deci and Ryan distinguish between different types of motivation based on the different reasons that lead to action. The most basic distinction in their theory is between intrinsic and extrinsic motivation (1985). Self-determination refers to the process of using the will (Deci & Ryan, 1980). To be self-determining, people have to decide how to act on their environment (Pintrich & Schunk, 2002). Deci and Ryan proposed that there are three basic innate psychological needs that underlie behaviour: competence (refers to the need to be effective in dealing with the environment), autonomy (refers to the need to control the course of our lives), and relatedness (refers to the need to the close relationships with others) (Deci & Ryan, 1980), and while SDT attempts to cover the range of all human behaviour, it recognises that only a subset of all behaviours is actually intrinsically motivated (Pintrich & Schunk, 2002). Intrinsic motivation has emerged as an important phenomenon for educators (Ryan & Deci, 2000) as intrinsic motivation results in high-quality learning, it is important to detail the factors that both support and undermine it (Ryan & Deci, 2000). In its initial stage, SDT appeared to have limited potential for classroom application, because it focused only on intrinsic motivation. Extrinsic incentives were later added (Brophy, 2010), since, for example, it is obvious that students may

follow learning goals because they recognise their value, even though they may not find the process of learning enjoyable in itself. Most intrinsic motivation theorists do not differentiate between the affective/fun aspects and cognitive/learning aspects (Brophy, 2010) and currently intrinsic motivation theorists tended to treat intrinsic and extrinsic motivations as opposites. Nevertheless, some intrinsic motivation theorists concede that extrinsic motivation can be used in ways that complement intrinsic motivation (Brophy, 2010).

Self-determination theory highlights the critical difference between behaviours that are intrinsically motivated, i.e. which are performed out of interest and satisfy innate psychological needs and drives for competence and autonomy, and those that are extrinsically motivated, i.e. performed because they are instrumental to separable outcomes (Ryan & Deci, 2000). To summarise, seeking only immediate enjoyment with no attention to external incentives may substantially reduce a student's future outcomes and opportunities. And vice versa, attending only to extrinsic incentives can considerably undermine intrinsic interest and the enjoyment that can come from learning itself (Lepper *et al*., 2005).

Research Questions: There are three questions which this study tried to answer,

- What are the factors that influence higher education students' motivation to and acceptance of the use of tablet computers for learning?
- How significant are the interrelationships between those factors?
- What are the moderating variables that affect the relationships between the variables in the MALT model?

Development of MALT: The majority of studies that adopted the TAM model have extended the model by including new variables to suit a particular context of the study. This is because the rate of technology devices adoption for learning is not the same in all countries (Nassuora, 2012). Likewise, this study developed the model to suit the context of mobile learning acceptance and motivation with specific regard to tablet computers. This study integrated the factors oforiginal technology acceptancemodel (TAM) with self-determination theory (SDT). It did not measure actual use of the system since there is no tangible mobile learning initiative implemented in higher education in Kingdom of Saudi Arabia. Furthermore, this study did not investigate the effect of gender or age. The majority of students in higher education are of almost of the same age and all the participants are female students. Similar to findings obtained in other studies conducted elsewhere (Jairak *et al*., 2009; Nassuora, 2012; Thomas *et al*., 2013) gender and age were also removed in the proposed research models.

Creation of Latent Variables: Many constructs, known as latent variables, cannot be assessed directly, and hence scale items are usually used as a means to the end of construct assessment (Kline, 1994). The items with the highest loadings are the ones that are most similar to the latent variables in the exploratory factor analysis (EFA) (Kline, 1994). According to the findings of the EFA, five constructs (latent variables) are extracted. Based on TAM and SDT factors as well as based on the result of the study, there are five constructs. They are behavioural intention, perceived enjoyment, and perceived image, perceived enablers and perceived value. Moreover, there are two moderating variables in the MALT model which are teacher support and access.Table 1 shows the codes for the five constructs.

Structural Model Evaluation And Hypothesis Testing: This section presents, discusses and tests the relationships between the latent constructs. The latent constructs are categorised into two main types: exogenous and endogenous constructs. In terms of path diagram, one or more arrows lead to endogenous constructs (dependent variables), while no arrows lead to exogenous constructs (independent variables) (Hair *et al*., 2010). The exogenous constructs are perceived enablers and perceived image, while the endogenous constructs are perceived enjoyment, perceived value and behavioural intention. Goodness of fit indices and other parameter estimates were performed to evaluate the hypothesised structural model. All the results indicated that all hypothesis paths were significant. The results are shown in detail below.

As the purpose of this study is to explore the factors and the significant relationships between them, and as one of the contributions of this study is the MALT model, the paths have been changed many times to make the analysis run properly. This was achieved by looking at the modification indices in the Amos output and removing the path that seemed to be problematic. This process probably provides a better fit to the data, and so the model was revised in order to make it fit the data well. Table 2 shows final paths.

Table 2 Hypothesis Paths

Hypotheses	Path
H1a.	PV → BI
H1b.	PV → PEJ
H2.	PEJ → BI
H3a.	PEN → BI
H3b.	PEN → PEJ
H3c.	PEN → PV
H4.	PIM → PV

Data collection Methods

Questionnaire: A questionnaire can be defined as a written list of questions which are read, interpreted and answered by a group of respondents (Dawson, 2006; Kumar, 1999; Thomas, 2013). The questionnaire is a widely used instrument for collecting survey information (Cohen *et al*., 2011) and can make use of closed-ended questions, open-ended questions, or a combination of both (Cohen *et al*., 2011; Dawson, 2006). The closed-ended questionnaire is the one used to generate statistics in quantitative research (Dawson, 2006). Many types of questionnaire items can be used, such as multiple choice, rating scales, ranking scales and open-ended questions, from which the researcher chooses those that best match the purposes of the research (Cohen *et al*., 2011).

The advantages of the questionnaire method are that it is less expensive, offers anonymity (Cohen *et al*., 2011; Kumar, 1999) and tends to be quicker and easier to code (Dawson, 2006). The drawbacks of using this method include low return rates, lack of opportunity to clarify the meaning to respondents (Cohen *et al*., 2011; Kumar, 1999) and predefined answers which may not match actual opinions (Dawson, 2006). The

questionnaire method can be used to collect data on attitudes (Dawson, 2006; Thomas, 2013) and thus is a suitable metric (measurement instrument) as this study investigates the attitudes and perceptions of people (Arksey & Knight, 1999). Another reason for choosing this instrument is that it is a relatively systematic and standardised method of collecting data which lays emphasis on the measurement and conversion of data from qualitative to quantitative forms. Therefore, closed as well as open-ended questionnaire has been used in this study.

Sample: As structural equation modelling (SEM) will be used in this study to test the research model, the sample size is not an issue as long as the minimum sample size criterion of 200 participants is satisfied (Hair *et al*., 2010). The sample size for this study was N=490 who answered the questionnaire. However, 303 are the valid.

Demographics information: The demographic characteristics of participants' gender, age and education are not included as the questionnaire was distributed only to female students, of the same age as undergraduate students. Full-time undergraduates in Kingdom of Saudi Arabia (KSA) are in the age range of 19 to 25. The education system in KSA is separated between male and female students and as the researcher is female, that's why this study addressed the female students. On the other hand, experience and discipline and usage of tablet have been included. It shows that majority of the respondents had more than three years' experience of tablet use (82%), whereas (17%) respondents had less than three years' experience of tablet use.135 participants (45%) were studying social science disciplines while 168 participants (55%) were studying natural sciences. This represents undergraduate students at King Abdulaziz university (KAU) as they register in only one of these disciplines. It also shows that all except one of the respondents use tablets for learning. 32% of respondents always use a tablet for learning and 27% use one regularly.

Data Analysis

Exploratory Factor Analysis (EFA): EFA can be used to determine the underlying structure of factors. The aim of it is to explore the field or to discover the main constructs or dimensions (Kline, 1994). Unfortunately EFA can produce confused or misleading results, leading some psychologists to reject it in favour of CFA (Kline, 1994). EFA can only suggest structuresand does in fact require CFA as a second step (Kline, 1994). The factor extraction method used in this study is principal component analysis with five- component extraction.

Structural Equation modeling (SEM): SEM was used in this research to test the fit of the model.A two-step approach was taken to produce the final model as recommended by Hair *et al*. (2010) and Muijs (2004). One is the measurement model and the other is the structural model. Confirmatory Factor Analysis (CFA) And Measurement Model. CFA is a type of measurement model that deals with the relationships between observed variables (manifest items) and latent variables (factors) (Muijs, 2004). The results of the fit measures obtained and their recommended levels are shown in Table 3. The results indicate that chi-square statistics (χ^2 =271.753,df= 160) are significant at $p<0.05$, indicating that the fit of the data to the model was not good and should be rejected, as it needs be insignificant to fit the model (Cohen *et al*., 2011). However, it can be misleading if the result depends only on the chi-square statistics for evaluation of the model specification, as it is sensitive to the sample size(Muijs, 2004), which in this study was 303. Thus, other fit indices such as GFI, AGFI, CFI and RMSEA were used to assess the model fit. The results yielded absolute fit measures of GFI: 0.921, RMSEA: 0.048; incremental fit measures of NFI: 0.930 and CFI: 0.970; and a parsimony fit measure of AGFI: 0.897 which is very close to 0.9. All these measures match the criteria except for the AGFI, which is too close to its criteria limit. Therefore, these goodness of fit measurements confirm that the model adequately fits the data. Moreover, other estimation criteria showed that the model fits the data adequately, such that standard regression weights were all greater than 0.7. To conclude, the results confirmed that the model fits the data, and so the unidimensionality of the model was established, Unidimensionality is present when "a set of measured indicators can be explained by only one underlying construct" (Hair *et al*., 2010: 696).

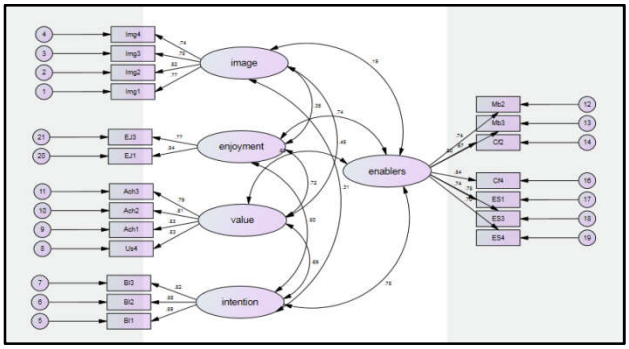

Figure 2 CFA

Assessment of the reliability and validity of constructs

Construct reliability (CR): The reliability of the measures was measured by examining the consistency of the respondents' answers to all items in the measure. This refers to Cronbach's alpha reliability coefficients, which were used to measure the internal consistency of each measure. Therefore, to find out the overall reliability of each of the latent constructs used in the model, construct reliabilities were performed. The results in Table 4show that the reliability coefficient for all of the constructs was above the recommended criteria of >0.7, representing strong reliability and high internal consistency in measuring relationships in the model.

Construct validity: Construct validity can be assessed by examining convergent validity, discriminant validity and nomological validity (Hair *et al*., 2010). The results of CFA provide evidence of the convergent and discriminant validity of theoretical constructs (Brown, 2006).

Convergent validity: Convergent validity is indicated by evidence that indicators of a specific construct share a high proportion of variance in common (Brown, 2006; Hair *et al*., 2010). The average variance extracted (AVE) is "a summary measure of convergence among a set of items representing a latent construct. It is the average percentage of variation

explained (variance extracted) among the items of a construct" (Hair *et al*., 2010: 688).

demonstrated a discriminant validity (based on the square root of AVE) greater than the other correlations in this model.

Table 3. Results of fit measures

	Absolute fit measures				Incremental fit measures		Parsimony fit measure
	χ^2	Df	GFI	RMSEA	NFI	CFI	AGFI
Criteria			≥ 0.90	<0.05	≥ 0.90	≥ 0.90	≥ 0.90
obtained	271.753	160	0.921	0.048	0.930	0.970	0.897
Note: χ^2 = chi-square; Df= degree of freedom; GFI= Goodness of fit index; RMSEA= root mean square error of approximation; NFI= normated fit index; CFI= comparative fit index; AGFI= adjusted goodness of fit. (Hair et al., 2010; Hooper et al., 2008; Muijs, 2004).							

Table 4. Constructs reliability, convergent and discriminant validity

	CR	AVE	Perceived enablers	Perceived image	Behavioural intention	Perceived value	Perceived enjoyment
Perceived enablers	0.902	0.570	0.755				
Perceived image	0.822	0.607	0.188	0.779			
Behavioural intention	0.889	0.728	0.752	0.309	0.853		
Perceived value	0.888	0.665	0.630	0.450	0.693	0.815	
Perceived enjoyment	0.790	0.653	0.740	0.354	0.802	0.719	0.808
Note: CR= Construct reliability; AVE= average variance extracted (convergent validity). The diagonal values are square roots of AVE (discriminant validity).							

Table 5 Hypothesis testing results

Construct	Code	Hypotheses	Path	Beta (β)	CR	P	Hypothesised Relationship (positive)
Perceived Value	PV	H1a.	PV ➔ BI	0.105	2.281	0.023	Yes
		H1b.	PV ➔ PEJ	0.392	8.514	***	Yes
Perceived enjoyment	PEJ	H2.	PEJ ➔ BI	0.457	8.805	***	Yes
Perceived enablers	PEN	H3a.	PEN ➔ BI	0.323	6.851	***	Yes
		H3b.	PEN ➔ PEJ	0.434	9.429	***	Yes
		H3c.	PEN ➔ PV	0.539	11.488	***	Yes
Perceived image	PIM	H4.	PIM ➔ PV	0.415	8.857	***	Yes
Note: BI = Behavioural intention (dependent variable in the model). Beta= Standardised regression weight; CR= critical ratio (t-value); P= significance value.							

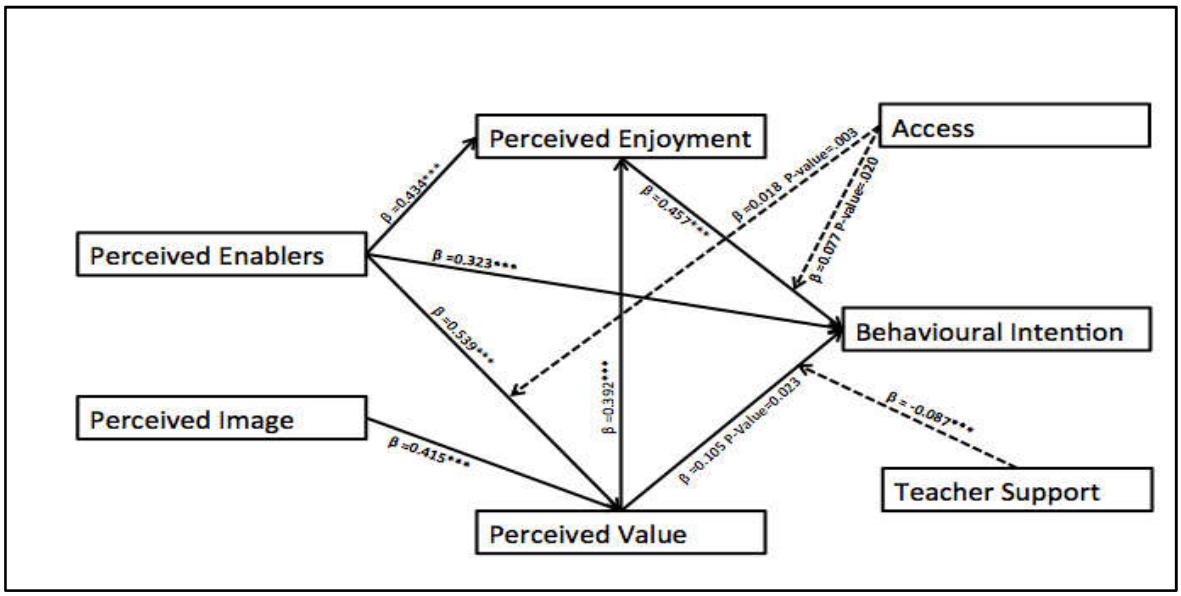

Figure 3. The MALT model

The results of the measurement model demonstrate the convergent validity of the latent constructs used in the model, since the AVE in Table 4all are above .5.

Discriminant validity: Discriminant validity is indicated by results showing that a construct is truly distinct from others (Brown, 2006; Hair *et al*., 2010). The discriminant validity was assessed by calculating the squared AVE for each construct. The results shown in Table 4revealed that the model

This suggests, therefore, that the measured items have more in common with the latent construct they were associated with than any of the other latent constructs; and so this provides strong support for discriminant validity.

Nomological validity: The nomological validity was tested by examining whether or not the correlations between the constructs in the measurement model make any sense (Hair *et al*., 2010). The construct correlations (estimates) were used to assess the nomological validity of the model. The results

indicated that all of the correlations were positive and significant. The CFA results show that the measures used in the measurement model had adequate reliability, convergent, discriminant, and nomological validity.

STRUCTURAL MODEL RESULTS

In testing the structural model hypothesis, the p-value was used to evaluate the statistical significance of the relationship between the latent variables to at least 0.05. The standardised path coefficient (β) indicates the effect of the variable on other variables in the model. The CR can be referred to as the standard normal distribution, therefore, CR values of ≥1.96 and ≤ -1.96 indicate two-sided significance (Hair *et al*., 2010). Table 5shows the results of the analysis for all of the MALT model hypotheses. The results presented in Table 5revealed that the seven hypothesised paths between independent and dependent variables were significant. For example, the hypothesised path between perceived value and behavioural intention with CR value of 2.281 (>1.96) was statistically significant (p = < 0.05). Moreover, paths between perceived enablers and perceived value; perceived image and perceived value; perceived enablers and perceived enjoyment; perceived value and perceived enjoyment; perceived enjoyment and behavioural intention; perceived enablers and behavioural intention were statistically significant at p =<.001. Thus, in testing the hypotheses, the results indicated that all seven hypotheses were positive and statistically significant. The results suggested that standardised regression estimates for these hypotheses indicated statistical significance. The more significant a correlation is, the more confident the researcher can be that there truly is a relationship between the variables (Kline, 1994). Hence, these hypotheses were supported.

The MALT Model: On the basis of all the analyses which were carried out, the MALT model was developed, as shown in Figure 3. MALT stands for motivation and acceptance of learning with tablets. It is based on the original technology acceptance model and self-determination theory. The dependent variable in the MALT model is behavioural intention. Moreover, there are two mediator variables of perceived enjoyment (which stands for intrinsic motivation) and perceived value (which stands for extrinsic motivation). There are two other independent variables of perceived enablers and perceived image. The moderator variables in this model are access and teacher support. In this model, perceived image has indirect influence on behavioural intention. Perceived enablers, enjoyment and value have significant direct influence on behavioural intention. In Figure **3**, the dashed lines show the moderation effect on the model and the original lines show the relationships between the latent factors in the model. The standardised regression weight and the significance levels are listed. The variables' codes and definitions are inTable 1. The questionnaire (instrument) which belongs to this model is attached in the appendix.

DISCUSSION AND CONCLUSION

In carrying out factor analysis and structural equation modelling (SEM) of the questionnaire results, the model was developed to include five factors with only two moderators. The dependent variable in the MALT model is behavioural intention.

Then there are two mediation variables of perceived enjoyment (standing for intrinsic motivation) and perceived value (standing for extrinsic motivation), followed by two other independent variables of perceived enablers and perceived image. The moderating variables in this model are access and teacher support. Perceived enablers combine three constructs, namely ease of use, self-efficacy and mobility. This study is in agreement with a study by Aziz (2015), who found that perceived mobility was one of the key factors that influenced students' intentions to continue using smart devices in their learning at Stockholm University, although mobility in this study is combined with other constructs and does not stand alone as a main factor. Moreover, Martin *et al*. (2013) studied students' motivation toadopt m-learning and reported that mobility was the main motivator. This study is also consistent with that of Cheung and Lee (2011), in that computer self-efficacy is an important indicator of perceived ease of use, and is also in line with research by Compeau and Higgins (1995), showing that self-efficacy plays an important role in determining technology usage. This study also agrees with Venkatesh and Bala (2008), who found that self-efficacy was a factor in the model they developed (TAM3). On the other hand, they examined the effects of self-efficacy only on perceived ease of use (Venkatesh & Bala, 2008), and did not assess its role within the full nomological net of TAM (Yi & Hwang, 2003). In the current study, self-efficacy has been combined with mobility and ease of use being perceived enablers, and perceived enablers has been examined with all other factors in the MALT model. Furthermore, several technology acceptance models have used the factor of perceived ease of use and found that it is important in predicting and explaining technology acceptance by users (Davis *et al*., 1989; Mathieson *et al*., 2001; Venkatesh & Bala, 2008; Venkatesh & Davis, 2000; Venkatesh *et al*., 2003). This study used the factor ease of use, but in combination with mobility and self-efficacy in perceived enablers.

Perceived value is a factor in the MALT model which combines achievement and usefulness. This is in agreement with findings that students perceived m-learning to be effective both in informal learning and for communication purposes (Al-fahad, 2009; El-hussein & Cronje, 2010; Al-Husain and Hammo, 2015). It is also consistent with the findings of Hocann and Iscioglu (2014), that students feel that using tablets has the effect of enriching their lessons. Perceived enjoyment is an important factor in the MALT model, as in previous TAM models, the motivational model (MM) and TAM3 (Davis *et al*., 1992; Venkatesh & Bala, 2008). Both Davis *et al*. (1992), who developed the motivational model, Schaik (2011), and Bertrand and Bouchard (2008) have treated perceived enjoyment as an indicator of intrinsic motivation, as for the current MALT model. The enjoyment factor is used to represent intrinsic motivation when exploring how intrinsic motivators affect an individual's technology acceptance behaviour (Leng *et al*., 2011). Perceived image is another factor in the MALT model which, according to the expert reflection in the third phase, is an important factor in the study context. Venkatesh and Davis (2000) added two more determinants to the original TAM when they developed TAM2: social influences and cognitive instrumental processes. The social influences include subjective norms and image. This study used image as a factor in the MALT model. Behavioural intention is a dependent factor in the MALT model. Studies have supported the notion that behavioural intention has a positive influence on actual behaviour

(AbdulRahman *et al*., 2011;Davis etal.,1989; Fishbein & Ajzen, 1975; Khechine *et al*., 2014; Leng *et al*., 2011). In all technology acceptance models and theories, behavioural intention is a factor. The second question asks about the relationship between the factors that influence students' motivation and acceptance when learning with a tablet. The SEM analysis of the student questionnaire indicates that perceived image and perceived enablers significantly influence perceived value; perceived enablers and perceived value significantly influence perceived enjoyment; and that perceived enablers, perceived value and perceived enjoyment significantly influence behavioural intention. Teo *et al*. (1999) reported that extrinsic motivation is generally stronger than intrinsic motivation. However, this study found the opposite, as intrinsic motivation (perceived enjoyment) was foundto be stronger than extrinsic motivation (perceived value) in predicting the behavioural intention of tablet use for learning. A study by Courtois *et al*., cited in Schnackenburg (2013), showed that secondary level students use tablets in classrooms because they perceive them to be a useful and enjoyable tool, and not because of peer pressure. The current study is in agreement on this point, since perceived value and enjoyment of using a tablet for learning was found to influence behavioural intention. However, perceived image does not appear to influence behavioural intention directly. The results of this study revealed that three factors of perceived value, perceived enjoyment and perceived enablers have a significant positive influence on students' mobile learning acceptance, and this matches the results of Mtebe and Raisamo (2014) and Wang *et al*. (2009), who concluded that performance expectancy, effort expectancy, social influence, and perceived playfulness were significant factors of behavioural intention to accept m-learning.

Many researchers suggest that those students who use mobile devices for learning purposes are motivated and engaged in learning and accordingly raise their achievement levels (Aziz, 2015; Rogers *et al*., 2010; Wang *et al*., 2009). In the MALT model, both factors of achievement and usefulness are combined in perceived value. This study is in agreement with the majority of TAM models in that perceived value has a direct influence on behavioural intention. In their study, Yoo *et al*. (2012) discovered that the extrinsic motivation factor of perceived usefulness directly influences the intention to use. Moreover, the TAM suggests that perceived usefulness is the strongest predictor of an individual's intention to use information technology (Davis, 1989; Venkatesh and Davis, 2000; Venkatesh *et al*., 2003). An interesting finding in this study is that perceived enjoyment is the strongest predictor of students' behavioural intention to use tablets for learning which is in contradiction to most of the TAM models results. The variable of perceived enjoyment is used in this study to represent intrinsic motivation, and it was found to have a positive influence on behavioural intention in the MALT model. This finding is consistent with Schaik (2011), who demonstrated the powerful role of intrinsic motivation in the acceptance of hedonic systems and recommended that intrinsic motivation should be a factor in technology acceptance models. An unexpected finding is that perceived image has a significant positive influence on perceived value and this contradicts Venkatesh and Bala's TAM3, which claimed that perceived image does not influences perceived usefulness. However, this study results are in agreement with Garg and Garg (2013) in which perceived image did not have a direct relationship with behavioural intention. Seifert and O'Keefe (2001) emphasise that students need to feel confident and have a sense of control over their learning in order to become motivated. Moreover, Zimmerman (2000) pointed out that students' perceptions of self-efficacy in their academic ability play a vital role in their motivation to achieve. The motivational impact of self-efficacy can be dramatic (Bandura, 1986,1989), as when individuals perceive their self-efficacy to be high, they will engage in tasks (Pintrich & Schunk, 2002). Igbaria and Iivari (1995), on the other hand, discovered that self-efficacy has an insignificant direct effect on perceived usefulness, but a strong indirect effect on perceived ease of use (Lopez & Manson, 1997). The findings of this study show that self-efficacy is combined with ease of use and is included with the perceived enablers, which positively influence perceived value. Compeau and Higgins (1995) showed that self-efficacy plays an important role in determining technology usage, both directly and through outcome expectation. This study is in agreement with this. In conclusion, in social sciences research, the issue of difference in statistical significance is common because of the complexity of human behaviour (Taiwo & Downe, 2013). The third research question can be answered using data from the questionnaires. Based on the factor analysis and SEM of the questionnaire results indicated that there are two moderators (access and teacher support) which had moderating effects on the MALT model. The finding ascertained that Internet access is a moderator in the MALT model. This is in agreement with several studies (Alsaadat, 2009; Huang *et al*., 2008; Mehdipour & Zerehkafi, 2013; Mohseni, 2014; Narayanasamy & Mohamed, 2013; Pajo & Wallace, 2001; Paris, 2005; Park, 2009) in which Internet access may influence users to accept to use mobile devices for learning. Moreover, the statistics indicate that access strengthens the relationships of enjoyment and enablers with behavioural intention. A case study in KSA by Alkhalaf (2015) found that m- learning requires good wireless network bandwidth in order for it to work well, and showed that students continue their learning activities outside class time wherever a wi-fi network is available. In another study, the majority of students in the sample, who were from a variety of disciplines, felt that the availability of wireless networks had increased their ability to work independently (Al-Fahad, 2009).

Thus, if the use of tablets is combined with wireless classrooms, learning could be enhanced (Paris, 2005). Moreover, this study shows that teacher support moderates the relationship between perceived value and behavioural intention, although it dampens the relationship between the two factors. This result is explained by the TAM experts' responses that the students belong to a different age group than their teachers, and feel more familiar with tablet use for learning, being 'digital natives'. Another explanation is that tablet use for learning should be available on a voluntary basis. The findings of this study are contrary to a study by Pintrich and Schunk (2002), who argued that teachers can influence students' motivation to do something. However, Martin *et al*. (2013) have pointed out that some studies indicate that technological innovations are more likely to be embraced by students than by their lecturers or teachers, and that this may affect students' perceptions of how technology can support their learning. It is generally thought that digital technology engages and motivates young people more (Higgins *et al*., 2012). Voluntariness is considered as a moderator in the extended technology acceptance model (TAM2).

REFERENCES

AbdulRahman, A., Jamaludin, A., & Mahmud, Z. (2011). Intention to Use Digital Library based on Modified UTAUT Model: Perspectives of Malaysian Postgraduate Students. *International Journal of Social, Management, Economics and Business Engineering*, *5*(3), 51–57.

Alkhalaf, S. (2015). Evaluating M-Learning in Saudi Arabian Higher Education: a Case Study. *International Journal of Emerging Trends & Technology in Computer Science (IJETTCS)*, *4*(5), 27–35.

Al-fahad, F. (2009). Students ' Attitudes And Perceptions Towards The Effectiveness Of Mobile Learning In King Saud University , Saudi Arabia, *8*(2), 111–119.

Al-Qirim, N. (2011). Determinants Of Interactive White Board Success In Teaching In Higher Education Institutions. *Computers & Education*, *56*(3), 827–838.

Al-Wabil, N. (2015). Usability of Mobile Applications in Saudi Higher Education: An Exploratory Study. In C. Stephanidis (Ed.), *HCI International 2015- Posters' Extended Abstracts* (pp. 201–205). Los Angeles: Springer.

Ali, S. (2012). Challenges and Benefits of Implementing Tablets in Classroom for e-Learning in a K-12 Education Environment – Case Study of a School in United Arab Emirates. *International Journal of Engineering and Science*, *3*(4), 39–42.

Almarwani, M.(2011). ML for EFL: Rationale for Mobile Learning. In *International Conference ICT for Language Learning* (pp. 1–5).

Alsaadat, K. (2009). Mobile Learning And University Teaching. In *International Conference on Education and New Learning Technologies* (pp. 1–11). Barcelona, Spain.

Arksey, H., & Knight, P. (1999). *Interviewing for Social Scientists*. London: SAGE Publications, Inc.

Aziz, N. (2015). *Smart Devices as U-Learning Tools: Key Factors Influencing Users' Intention*. Stockholm Business School.

Bandura, A. (1986). *Social Foundations of Thought and Action: A Social Cognitive Theory*. Englewood Cliffs, NJ: Prentice- Hall Inc.

Bandura, A. (1989). Social Cognitive Theory. In R. Vasta (Ed.), *Annals of child development. Vol. 6. Six theories of child development* (pp. 1–60). Greenwich, CT: JAI Press.

Behera, S. (2013). E- And M-Learning: A Comparative Study. *International Journal on New Trends in Education and Their Implications*, *4*(3), 65–78.

Bertrand, M., & Bouchard, S. (2008). Applying The Technology Acceptance Model To Vr With People Who Are Favorable to its Use. *Journal of Cyber Therapy & Rehabilitation*, *1*(2), 200–210.

Brophy, J. (2010). *Motivating Students to Learn* (3rd ed.). London: Routledge.

Brown, T. (2006). Confirmatory Factor Analysis for Applied Research. In D. A. Kenny (Ed.), *Methodology in the Social Science*. New York: THE GUILFORD PRESS.

Cheung, C., & Lee, M. (2011). Exploring The Gender Differences In Students Acceptance On An Internet-Based Learning Medium. In T. Teo (Ed.), *Technology Acceptance in Education Research and Issue* (pp. 183–200). Rotterdam: Sense Publisher.

Clarke, B., & Svanaes, S. (2014). An Updated Literature Review on the Use of Tablets in Education. *Tablet For Schools*, (April).

Cohen, L., Manion, L., & Morrison, K. (2011). *Research Methods in Education* (7th ed.). New York: Routledge.

Compeau, D., & Higgins, C. (1995). Computer Self-Efficacy: Development of a Measure and Initial Test. *MIS Quarterly*, *19*(2), 189–211.

Davis, F., Bagozzi, R., & Warshaw, P. (1989). User Acceptance of Computer Technology: A Comparison of Two Theoretical Models. *Management Science*. https://doi.org/10.1287/mnsc.35.8.982

Davis, F. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly*, *13*(3), 319–340.

Dawson, C. (2006). *A practical Guide to Research Methods A User - Friendly Manual for Mastering Research Techniques and Projects* (2nd ed.). Oxford, UK: How To Books Ltd.

Deci, E., & Ryan, R. (1980). The Empirical Exploration of Intrinsic Motivational Processes. In L. Berkowitz (Ed.), *Advances in Experimental Social Psychology, Volume.13* (pp. 39–80). New York: Academic Press.

El-hussein, M., & Cronje, J. (2010). Defining Mobile Learning in the Higher Education Landscape Research method. *Educational Technology & Society*, *13*, 12–21.

Fischer, N., Smolnik, S., & Galletta, D. (2013). Examining the Potential for Tablet Use in a Higher Education Context. In *11th International Conference on Wirtschaftsinformatik* (pp. 9–22).

Fishbein, M. and Aijzen, I. (1975). *Belief, Attitude, Intention and Behaviour: An Introduction to Theory and Research*. Reading, MA: Addison-Wesley.

Garg, A., & Garg, D. (2013). An Assessment of 3G Internet Service Acceptance in Botswana: Technology Acceptance Model with Social Influence and Price Perception. *Pakistan Journal of Social Sciences (PJSS)*, *33*(1), 47–60.

Gursul, F., & Tozmaz, G. (2010). Which One Is Smarter? Teacher Or Board. *Procedia - Social and Behavioral Sciences*, *2*(2), 5731–5737.

Hair, J., Black, W., Babin, B., & Anderson, R. (2010). *Multivariate Data Analysis: A Global Perspective* (7th ed.). Boston: Pearson Education Inc.

Higgins, S., Xiao, Z., & Katsipataki, M. (2012). *The Impact of Digital Technology on Learning : A Summary for the Education Endowment Foundation*. Durham.

Hooper, D., Coughlan, J., & Mullen, M. (2008). Structural Equation Modelling: Guidelines for Determining Model Fit. *Electronic Journal of Business Research Methods*, *6*(1), 53–60.

Huang, Y., Kuo, Y., Lin, Y., & Cheng, S. (2008). Toward Interactive Mobile Synchronous Learning Environment With Context-Awareness Service. *Computers & Education*, *51*(3), 1205–1226.

Igbaria, M., & Iivari, J. (1995). The Effects of Self-Efficacy on Computer Usage. *Omega*, *23*(6), 587–605.

Johnson, L., Adams Becker, S., Cummins, M., Estrada, V., Freeman, A., & Ludgate, H. (2013). *NMC Horizon*

Report: 2013 Higher Education Edition. Austin, Texas: The New Media Consortium.

Khechine, H., Pascot, D., Bytha, A., & Sawsen, L. (2014). UTAUT Model for Blended Learning : The Role of Gender and Age in the Intention to Use Webinars. *Interdisciplinary Journal of E-Learning and Learning Objects*, *10*, 33–52.

Kline, P. (1994). *An Easy Guide to Factor Analysis*. London: Routledge.

Kothaneth, S., Robinson, A., & Amelink, C. (2012). Tablet PC Support of Students ' Learning Styles. *Systemics, Cybernetics and Informatics*, *10*(6), 60–63.

Kumar, R. (1999). *Research Methodology A Step-by-Step For Beginners*. London, UK: SAGE Publications, Inc.

Leng, G., Lada, S., Muhammad, M., Ibrahim, A.., & Amboala, T. (2011). An Exploration of Social Networking Sites (SNS) Adoption in Malaysia Using Technology Acceptance Model (TAM), Theory of Planned Behavior (TPB) And Intrinsic Motivation. *Journal of Internet Banking and Commerce*, *16*(2), 1–27.

Lepper, M., Corpus, J., & Sheena, I. (2005). Intrinsic and Extrinsic Motivational Orientations in the Classroom: Age Differences and Academic Correlates. *Journal of Educational Psychology*, *97*(2), 184–196.

Liaw, S.-S., & Huang, H.-M. (2011). Exploring Learners' Acceptance Toward Mobile Learning. In T. Teo (Ed.), *Technology Acceptance in Education: Research and Issues* (pp. 145–157). Sense Publisher.

Lopez, D., & Manson, D. (1997). A Study Of Individual Computer Self-Efficacy And Perceived Usefulness Of The Empowered Desktop Information System. *Business Administration Computer Information Systems*, 83–92.

Ma, W., & Yuen, A. (2011). E-Learning System Acceptance And Usage Pattern. In T. Teo (Ed.), *Technology Acceptance in Education Research and Issueh* (pp. 201–216). Rotterdam: Sense Publisher.

Martin, S., Diaz, G., Sancristobal, E., Gil, R., Castro, M., & Peire, J. (2011). New technology trends in education: Seven years of forecasts and convergence. *Computers & Education*, *57*(3), 1893–1960.

Mathieson, K., Peacock, E., & Chin, W. (2001). Extending the Technology Acceptance Model: The Influence of Perceived User Resources. *The Data Base for Advances in Information Systems*, *32*(2), 86–112.

Mang, C., & Wardley, L. (2012). Effective Adoption of Tablets in Post-Secondary Education : Recommendations Based on a Trial of iPads in University Classes. *Journal of Information Technology Education: Innovations in Practice*, *11*, 301–317.

Mehdipour, Y., & Zerehkafi, H. (2013). Mobile Learning for Education : Benefits and Challenges. *International Journal of Computational Engineering Research*, *3*(6), 93–101.

Mohseni, A. (2014). *Educational Technology : The Tablet Computer as a Promising Technology in Higher Education*. University of Alberta.

Moran, M., Hawkes, M., & El Gayar, O. (2010). Tablet Personal Computer Integration in Higher Education: Applying the Unified Theory of Acceptance and Use Technology Model to Understand Supporting Factors. *Journal of Educational Computing Research*, *42*(1), 79–101. https://doi.org/10.2190/EC.42.1.d

Mtebe, J., & Raisamo, R. (2014). Investigating Students' Behavioural Intention To Adopt And Use Mobile Learning In Higher Education In East Africa. *International Journal of Education and Development Using Information and Communication Technology (IJEDICT)*, *10*(3), 4–20.

Muijs, D. (2004). *Doing Quantitative Research in Education with SPSS*. London: SAGE Publications, Inc.

Narayanasamy, F., & Mohamed, J. (2013). Adaptation of Mobile Learning in Higher Educational Institutions of Saudi Arabia. *International Journal of Computer Applications*, *69*(6), 34–38.

Nassuora, A. (2012). Students Acceptance of Mobile Learning for Higher Education in Saudi Arabia. *American Academic & Scholarly Research Journal*, *4*(2), 1–6.

Pajo, K., & Wallace, C. (2001). Barriers to the Uptake of Web-Based Technology by University Teachers. *Journal of Distance Education*, *16*(1), 70–84.

Paris, M. (2005). Tablet Pcs, Mobile Learning, And Higher Education: In Search Of A Paradigm? In *IADIS International Conference Mobile Learning* (pp. 1–5).

Park, S. (2009). An Analysis of the Technology Acceptance Model in Understanding University Students ' Behavioral Intention to Use e-Learning Research hypotheses. *Educational Technology & Society*, *12*(3), 150–162.

Pintrich, P., & Schunk, D. (2002). *Motivation in Education: Theory, Research and Applications* (2nd ed.). New Jersey: Pearson Education Inc.

Rogers, Y., Connelly, K., Hazlewood, W., & Tedesco, L. (2010). Enhancing Learning: a Study of How Mobile Devices can Facilitate Sense Making. *Personal & Ubiquitous Computing*, *14*(2), 111–124.

Ryan, R., & Deci, E. (2000). Intrinsic and Extrinsic Motivations: Classic Definitions and New Directions. *Contemporary Educational Psychology*, *25*, 54–67.

Schaik, P. (2011). Unified Theory Of Acceptance And Use For Web Sites Used By Students In Higher Education. In T. Teo (Ed.), *Technology Acceptance in Education Research and Issue* (pp. 159–182). Rotterdam: Sense Publisher.

Schnackenberg, H. (2013). Tablet Technologies and Education. *International Journal of Education and Practice*, *1*(4), 44–50.

Seifert, T., & O'Keefe, B. (2001). The Relationship of Work Avoidance and Learning Goals to Perceived Competence, Externality and Meaning. *British Journal of Educational Psychology*, *71*(1), 81–92.

Taiwo, A., & Downe, A. (2013). The Theory Of User Acceptance And Use Of Technology (UTAUT): A Meta-Analytic Review Of Empirical Findings. *Journal of Theoretical and Applied Information Technology*, *49*(1), 48–58.

Teo, T.., Lim, V., & Lai, R. (1999). Intrinsic and Extrinsic Motivation in Internet Usage. *The International Journal Of Management Science*, *27*(1), 25–37.

Thomas, G. (2013). *How To Do Your Research Project A Guide for Students in Education and Applied Social*

Sciences (2nd ed.). London, UK: SAGE Publications, Inc.

Venkatesh, V., & Bala, H. (2008). Technology Acceptance Model 3 and a research agenda on interventions. *Decision Sciences Journal of Innovative Education*, *39*(2), 273–315.

Venkatesh, V., & Davis, F. (2000). A Theoretical Extension of Technology Acceptance Model: Four Longitudinal Field Studies. *Management Science*, *46*(2), 186-204.

Venkatesh, V., Morris, M., Davis, G., & Davis, F. (2003). User Acceptance Of Information Technology: Toward A Unified View. *MIS Quarterly*, *27*(3), 425–478.

Wang, R., Wiesemes, R., & Gibbons, C. (2012). Developing Digital Fluency Through Ubiquitous Mobile Devices: Findings From a Small-Scale Study. *Computers & Education*, *58*(1), 570–578.

Williams, A., & Pence, H. (2011). Smart Phones, a Powerful Tool in the Chemistry Classroom. *Journal of Chemical Education*, *88*(6), 683–686.

Yi, M., & Hwang, Y. (2003). Predicting The Use Of Web-Based Information Systems: Self-Efficacy, Enjoyment, Learning Goal Orientation, And The Technology Acceptance Model. *International Journal of Human-Computer Studies*, *59*, 431–449.

Yoo, S., Han, S., & Huang, W. (2012). The Roles of Intrinsic Motivators and Extrinsic Motivators in Promoting E-learning in the Workplace: A Case From South Korea. *Computers in Human Behavior*, *28*(3), 942–950.

Zimmerman, B. (2000). Self-Efficacy: An Essential Motive to Learn. *Contemporary Educational Psychology*, *25*(1), 82–91.

Appendix

The Questionnaire

Q1. Describe the quality of the next statements (3=strong, 2=fair, 1=poor)

1. Access to the internet at the university.
2. The teacher's support you to learn using a tablet.

****

Q2. To what extent do you agree to the following statements? (7=strongly agree, 6=moderately agree, 5=agree, 4=neutral, 3=disagree, 2=moderately disagree, 1=strongly disagree)

No.	Item	Construct
1	Learning how to use a tablet is easy for me.	Perceived enablers
2	Overall, I find the tablet easy to use.	
3	It is easy for me to use the tablet to do what I want to do.	
4	I am able to use a tablet for learning.	
5	I believe that I can use tablet for learning.	
6	The mobility of a tablet makes it possible to learn with.	
7	Mobility of a tablet is an outstanding advantage of a tablet to learn with.	
8	I find using a tablet for learning to be entertaining.	Perceived enjoyment
9	I have fun using a tablet for learning.	
10	My friends at the university who use tablets for learning have more prestige than those who do not.	Perceived image
11	My friends at the university who use tablets for learning have a high profile.	
12	Having a tablet to learn with is a status symbol at my university.	
13	My friends at the university who use tablets for learning are considered modern.	
14	I have better grades when using tablet for learning.	Perceived value
15	I increase my chances of getting good grades by using tablet for learning.	
16	I have better academic results when using tablet for learning purposes.	
17	Using a tablet for learning improves my academic performance.	
18	I intend to use the tablet for learning in the future.	Behavioural intention
19	I predict I will use the tablet for learning in the future.	
20	I plan to use the tablet for learning in the future.	