DETERMINANTS AFFECTING ACCEPTANCE LEVEL OF MOBILE LEARNING AMONG PUBLIC UNIVERSITY STUDENTS

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DECLARATION

We hereby declare that:

1. This UBAZ 3013 Research Methodology and Project is the end result of our own work and that due acknowledgement has been given in the references to all sources of information be they printed, electronic, or personal.
2. No portion of this research project has been submitted in support of any application for any other degree or qualification of this, or any other university or institution of learning.
3. Equal contribution has been made by each group member in completing the research project.
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LIST OF ABBREVIATIONS

ANOVA	Analysis of variance
BI	Behavioural Intention
C-TAM-TPB	Combined TAM and TPB
EE	Effort Expectancy
E-learning	Electronic learning
FC	Facilitating Conditions
IDT	Innovation Diffusion Theory
IS	Information System
IT	Information Technology
IV	Independent Variables
M-learning	Mobile learning
MM	Motivational Model
MPCU	Model of PC utilization
MSC	Multimedia Super Corridor
ODL	Open and Distance Learning
OUM	Open University Malaysia
PDAs	Personal Digital Assistant
PE	Performance Expectancy
PP	Perceived Playfulness

R^2	Coefficient of Determination
SCT	Social Cognitive Theory
SI	Social Influence
SMS	Short Message Service
SPSS	Statistical Package for the Social Sciences
TAM	Technology Acceptance Model
TPB	Theory of Planned Behavior
TRA	Theory of Reasoned Action
USM	University Sains Malaysia
UTAUT	Unified Theory of Acceptance and Use of Technology

PREFACE

In the past, the teaching process was done through blackboards and chalks. But as time goes by, the evolution and advancement of information technology has brought development in the education industry in the area of effective learning. With recent technology achievements and an increase in popularity of mobile devices around the world, web-based self-learning through the use of mobile devices has become possible and the industry is slowly moving away from traditional methods of teaching and learning. Educators around the world are adopting mobile technology as pedagogical tools. The global push towards m-learning has, hence, lead to this study on factors which need to be considered for effective implementation of M-learning.

ABSTRACT

Mobile devices have been gradually getting more popular around the world. Due to their popularity, the education sector has considered mobile learning (M-learning) technologies as pedagogical tools as users are able to use their devices for self learning anytime and anywhere.

This research hopes to increase the knowledge for the education sector towards the understanding of students' perceptions towards M-learning and to create awareness as many benefits of M-learning has not yet been fully realized in Malaysia. It also hopes to serve as a base for future studies for Malaysia's education research on M-learning.

The theoretical foundation for this study is a modified version of UTAUT technology acceptance theory with an additional variable which is perceived playfulness. Research methodology used is a cross-sectional survey method to collect data from 384 students through a five-point Likert scale questionnaire. Tests conducted in this research are Normality, Reliability Test, Pearson Correlation Coefficient Statistic, and Multiple Regression Analysis.

The results show a significant relationship between all the variables which are effort expectancy, performance expectancy, social influence and perceived playfulness towards behavioural intention which is the dependent variable. Based on the result of this study, it is possible to be implemented M-learning widely in Malaysia as the student acceptance level towards the acceptance level of M-learning it is relatively high.

CHAPTER 1: RESEARCH OVERVIEW

1.0 Introduction

This chapter discusses the background of the study, the problem statement, the research objectives and questions, and provides the significance of this study.

1.1 Research Background

The education industry has evolved considerably over the last 50 years and the industry now faces significant trends that offer the potential to create dramatic opportunities for effective learning (West & Schofield, 2010). Recently, experience and expertise in mobile learning (M-learning) have blossomed and evolved in education industry (Ally, 2009). According to Abas, Chng, and Mansor (2009) M-learning is geared to be the next revolution in education because it offers enormous potential as a pedagogical tool.

M-learning is educational instructions given in environments supported with mobile technologies such as smart phones, tablet computers and notebooks (Traxler, 2005). Theoretically, M-learning enhances the access for those who are mobile or unable to attend learning institutions physically and it makes the learning process more reachable in that it enables learners to follow their studies according to their own plan (Sharples, Taylor, & Vavoula, 2007). Thus, M-learning broadens the learning experience and it is an effective pedagogy system for engaging learners on their own territory (Mellow, 2005).

In Malaysia, the government has included the creation of smart schools as a developmental component in one of its seven flagship applications under the Multimedia Super Corridor (MSC) and smart schools have included advance learning pedagogy, which includes M-learning systems to complement traditional pedagogy (Mahamad, Ibrahim, Foad, & Taib, 2008).

Open University Malaysia (OUM) is the pioneer in open and distance learning (ODL) education. Research on M-learning in OUM was started in 2008 to drive the innovation in a systematic way and measure the preparedness of learners, technologically and psychologically, for M-learning (Abas et al., 2009).

Universiti Sains Malaysia (USM) is using M-learning methods to conduct a distance learning programme by using SMS technology which allowed the lecturers to send notes and important notices to students. Research on the satisfaction levels of 105 USM students was done through questionnaires and results were analysed using the Rasch model. The researchers found that the majority of the students were satisfied with M-learning (Ismail, Gunasegaran, Koh, & Idrus, 2010).

In Abas et al. (2009) a survey of 2,837 students found that 83% felt it was possible to learn through mobile devices, and 64% felt ready to learn from M-learning in future. Thus, the growth of mobile technologies and the acceptance of Malaysians for mobile communications have prompted academicians to consider M-learning. Moreover, with the increasing attention of M-learning in the education industry, there is a need to examine the user acceptance or intention to use M-learning in order to take stock of the available evidence of the educational benefits it provides (Dighe, Hakeem, & Shaeffer, 2009; Nassuora, 2012).

This research will focus on public university students as Sirat and Kaur (2010) has mentioned that Malaysia public universities are literally the agents for societal development and human capital formation. Hence, the government will likely spend more on public universities for nation development. For example, Universiti Sains

Malaysia has implemented M-learning, with a RM 330,000 (US$190,000) grants from the Education Ministry (Guo, 2011). In addition, out of a total estimated spending from Malaysia's 2012 budget of RM 232.8 million, RM50.2 million is allocated to the education sectors, or approximately 20%. It is also encouraging to note that the Malaysian government emphasizes development in M-learning for its 20 - 23 million mobile users (Abas et al., 2009). Hence, it will be meaningful for this research to test public university students' acceptance on M-learning.

Determinants (performance expectancy, effort expectancy, social influence and perceived playfulness) that affect the acceptance level of M-learning among the students will be examined. It is important for an institution to examine and understand the determinants that affect student acceptance level towards M-learning as innovative information technology will not be able to reach its full potential if students in the university do not accept and value it (Donaldson, 2011). Understanding determinants affecting acceptance level of students can help university management to allocate funds and identify the type of content that should be available on M-learning (Lam, Lam, Lam, & McNaught, 2009).

1.2 Problem statement

M-learning at a tertiary level is still in the beginning stages of implementation globally, and the pedagogy surrounding M-learning are evolving and require further research (Kukulska-Hulme, 2007). M-learning is in its infancy stage, different categories of M-learning pedagogy are being developed, identified, and researched (Frohberg, 2006). Thus, Spencer and Hughan (2008) suggest that more research is needed to determine whether students perceive a benefit to use M-learning.

According to Pedersen and Ling (2003) and Wang, Wu, and Wang (2009) M-learning has unique characteristics that traditional technology acceptance models such as Technology Acceptance Model (TAM) may not have fully address. Therefore, further research is needed on the new technology acceptance model – Unified Theory of Acceptance and Use of Technology (UTAUT) – with regards to acceptance of M-learning, which includes usage behavior and all independent variables and additional variables such as perceived playfulness to ensure the reliability of new technology research and allowed further validation of UTAUT (Wang et al., 2009).

Some deficiencies have been recognized in past studies. For instance, efforts to apply information towards the adoption model in order to explain the students' intention to use M-learning have been limited. Thus, further investigation is needed to determine whether these models need modification to address M-learning acceptance (Pedersen & Ling, 2003).

1.3 Research Objectives

The purpose of this paper is to examine the relationship between the determinants and the acceptance of M-learning among public university students in Klang Valley, Malaysia.

1.3.1 General Objective

Perceptions of public university students towards M-learning have recently gained greater attention. Therefore, investigation on users' perception towards M-learning is relatively important. This paper is concerned with the determinants that M-learning implementers should take into consideration to enhance user perception of M-learning and build a good foundation for future application of M-learning.

1.3.2 Specific Objective

The specific objectives are elaborated from the general objective above. The specific objectives are as follows:

i. To examine the relationship between determinants and acceptance of M-learning among public university students in Klang Valley.

ii. To examine the relationship between performance expectancy and acceptance of M-learning among public university students in Klang Valley.

iii. To examine the relationship between effort expectancy and acceptance of M-learning among public university students in Klang Valley.

iv. To examine the relationship between social influence and acceptance of M-learning among public university students in Klang Valley.

v. To examine the relationship between perceived playfulness and acceptance of M-learning among public university students in Klang Valley.

1.4 Research Questions

The research questions formulated in this study are as follow:

i. Is there any significant relationship between determinants and acceptance of M-learning among public university students in Klang Valley?

ii. Is there any significant relationship between performance expectancy and acceptance of M-learning among public university students in Klang Valley?

iii. Is there any significant relationship between effort expectancy and acceptance of M-learning among public university students in Klang Valley?

iv. Is there any significant relationship between social influence and acceptance of M-learning among public university students in Klang Valley?

v. Is there any significant relationship between perceived playfulness and acceptance of M-learning among public university students in Klang Valley?

1.5 Significance of Study

This study has included the original UTAUT and an additional independent variable (perceived playfulness) which have significant relationships with the acceptance of M-learning. All the variables examined are crucial to justify the acceptance level of students in public university. Thus, it is important for institutions to understand the determinants that influence students' perception before investing in and implementing M-learning.

The information and result available in this study would provide educators, administrators and managements in Malaysian public universities with the knowledge of students' acceptance and intention to use M-learning to access academic content in study. Thus, it would benefit the education industry as the potential value of M-learning has not fully been realized in Malaysia.

In terms of theoretical contributions, this study will retest existing research findings that contribute to establishing the determinants affecting the acceptance of M-learning among public university students. This study will also reexamine the extended construct with the additional variable of perceived playfulness under UTAUT model. This is a significant research because the study is using a relatively contemporary model, UTAUT, to measure the acceptance of public university students towards an information technology initiative, which will further validate the extended UTAUT model.

1.6 Chapter Layout

Chapter 1

This chapter covers the overview of this research which includes research background, problems statement, research objectives, research questions, significant of the study, chapter layout and an overall conclusion of chapter 1.

Chapter 2

This chapter is to build a theoretical foundation for the research by reviewing relevant journals articles to identify research issues which are worth researching. Besides that, theoretical framework also being provided to proceed with further investigation.

Chapter 3

This chapter illustrates the background of the business research and research methodology, research design, data collection methods, sampling design, research instrument, constructs measurement, data processing and data analysis.

Chapter 4

This chapter depicts interpretations of the result based on data analysis.

Chapter 5

This chapter discuss about the major findings, implications, limitations of this research project and recommendations for future research study.

1.7 Conclusion

After determined the problem statement, research questions and objectives, and the significant of this study, this study aims to determine the determinants affecting the acceptance level of M-learning among public university students. Chapter 2 would then provide the relevant literature review.

CHAPTER 2: LITERATURE REVIEW

2.0 Introduction

After listing the research background, problem statement, research questions, objectives, and significance of this study in Chapter 1, this chapter aims to provide the relevant literature review which is the theoretical foundation, the review of prior empirical studies, and the proposed research model.

2.1 Theoretical/ Conceptual Foundation

"Technology acceptance research is the most matured research area in information systems (IS) literature" (Venkatesh, Morris, Davis, & Davis, 2003, p. 426). Taylor and Todd (1995) stated that determining the value of information technology to educational organizations and understanding the determinants of that value are keys to acceptance, integration, and use of technology. UTAUT is a model with a combination of earlier technology acceptance model such as Technology Acceptance Model (TAM), Theory of Reasoned Action (TRA) and Theory of Planned Behaviour (TPB).

Venkatesh et al. (2003) developed the UTAUT model to explain user intentions to use a new information system and subsequent usage behaviour. UTAUT explains technology acceptance behaviour which consists of four key constructs that are, (1) Performance Expectancy (PE), (2) Effort Expectancy (EE), (3) Social Influence (SI) and (4) Facilitating Conditions (FC) which directly influence use intention. The UTAUT technology acceptance theory will be used as the theoretical foundation for this study. UTAUT is found to be up to 70% precise in predicting the acceptance of users of computer-based technology while models like TAM, TRA, and TPB are able

to predict only 40%. By creating a markedly high percentage of technology innovation success, UTAUT is deemed a superior model (Davis, 1989; Taylor & Todd, 1995; Venkatesh & Davis, 2000; Venkatesh et al., 2003).

Pedersen and Ling (2003) suggested that technology acceptance model frameworks as such as UTAUT can be modified in order to fully reflect the specific influences of user behavioural intentions towards mobile internet services which is similar with M-learning. In this research, perceived playfulness is added because it suits this study as learning is a process that contains a degree of performance pressure. Therefore, being able to make learning more enjoyable can promote acceptance of M-learning. It is also reported that when "the process is novel, interesting, enjoyable, exciting, and optimally challenging, students will be intrinsically motivated to pursue learning activities" (Liu, 2008; Liu, Han, & Li, 2010, p. 219). Agarwal and Karahanna (2000) have also stated that perceived playfulness will provide intrinsic motivation when individuals become completely absorbed in a technology, with the objective of getting pleasure from it. Hence, perceive playfulness is important enough to be included in this study.

Pedersen and Ling (2003) suggested that technology acceptance model can be modified to fully reflect the study. Wang et al. (2009) have also modified the original UTAUT with the intention of reflecting more of the specific influences of M-learning context factors in studying the acceptance level of M-learning. Wang et al. (2009) have modified UTAUT to the extent that facilitating conditions is replaced by other variables such as perceive playfulness in order to reflect a better picture in examining the behavioural intention to use a new technology.

One of the key constructs of UTAUT, facilitating conditions, is omitted in this research and this omission has been supported in several researches such as Pedersen and Ling (2003) and Wang et al. (2009). Furthermore, it was also found that "when both performance expectancy construct and effort expectancy construct are present, facilitating conditions becomes non-significant in predicting intention" (Venkatesh et

al., 2003, p. 454). This result is also supported by Cheng, Yu, Huang, Yu, and Yu (2011) who excluded facilitating conditions in investigating users' acceptance on M-learning as they have included performance expectancy and effort expectancy. Furthermore, Venkatesh et al. (2003) has also stated that facilitating conditions will only significantly influence usage behaviour if it is moderated by experience and age. Since this research focuses on independent key constructs and not the moderating variables, facilitating conditions will not be taken into consideration.

2.2 Review of the Prior Empirical Studies

2.2.1 Behavioural Intention

Behavioural intentions capture motivational factors that influence a behaviour and indicate the diligence and effort that people put forward to perform the behaviour (Ajzen, 1991). Behavioural intention is an individual's subjective probability of performing a behavior, and is the determinant of actual usage behaviour (Yi, Jackson, Park, & Probst, 2006). Apart from that, behavioural intention is also defined as a user group willing to use information technologies for their tasks by Dillon and Morris (1996). This willingness can be measured as actual usage or intention to use the information technology (Martocchio, 2005).

Furthermore, Chau and Hu (2002) state that behavioural intention is explaining or predicting an individual's likelihood of performing a conscious act, such as deciding to accept (or use) a technology. Hence, in this research, the students' acceptance level of M-learning will be measured using behavioural intention as many studies also used behavioural intention to use measure user acceptance (Gunawardana & Ekanayaka, 2009; Jairak, Praneetpolgrang, & Mekhabunchakij, 2009; Wang et al., 2009).

In the context of information technology, there had many technology acceptance models used to measure behavioural intention to use a technology such as UTAUT, TAM, TRA and TPB (Abdul Rahman, Jamaludin, & Mahmud, 2011). Among these four models, UTAUT has become the powerful and latest model to gauge and rationalize information systems use intentions as the UTAUT is incorporating with eight famous models in the diverse discipline which are (1) Theory of Planned Behaviour (TPB), (2) Motivational Model (MM), (3) Technology Acceptance Model (TAM), (4) Theory of Reasoned Action (TRA), (5) Combined TAM and TPB (C-TAM-TPB), (6) Model of PC utilization (MPCU), (7) Innovation Diffusion Theory (IDT) and (8) Social Cognitive Theory (SCT) (Abdul Rahman et al., 2011; Jimoh & Norshuhada, 2009). The four constructs of UTAUT is taken from all the dimensions of the eight technology acceptance and adoption models and that is why it is suitable in all domains of behavioural intention to use a technology (Biljon & Kotze, 2007). UTAUT have been used and validated in many areas of behavioural intention to use a technology (Biljon & Kotze, 2007; Wu, Tao, & Yang, 2007). Therefore, in this research UTAUT had been used to measure behavioural intention to use M-learning.

2.2.2 Relationship of the Independent Variables (PE, EE, SI, and PP) with Dependent Variable (intention to use M-learning)

UTAUT has been supported as a reliable theoretical framework for studying technology acceptance (Straub, 2009) and additional variables, especially perceived playfulness, has also been repeatedly adopted, as shown below.

M-learning researchers from Sri Lanka, Gunawardana and Ekanayaka (2009) had employed a research model consisting of performance expectancy, social influence, effort expectancy through UTAUT, and the additional variable of perceived playfulness which is similar with this current study. In their

research, the results strongly corroborated with Huang, Lin, and Chuang (2007) where all the variables were found to impact student intentions to use M-learning.

Similar technology model has been used by Chiu and Wang (2008) and Chang, Wong, and Chang (2011) in conducting their research on web-based learning intentions by extending UTAUT with perceived playfulness. In both researhes, the model fit testing has been conducted and found that their proposed model fitted with the data reasonably well.

Wang et al. (2009) combined UTAUT with perceived playfulness in their research in Taiwan. All the variables were significant to student intentions to use M-learning with the recommendation benchmark set by Hair, Anderson, Tatham, and Black (1992).

2.2.3 Performance Expectancy and Acceptance Level of M-learning

Al-Gahtani, Hubona, and Wang (2007) and Venkatesh et al. (2003) defined performance expectancy as the belief of individuals that use of a system will help them improve their performance. Adapting performance expectancy to M-learning suggests that m-learners will find M-learning useful because it enables learners to accomplish learning activities more quickly, effectively and flexibly (Wang et al., 2009).

Al-Gahtani et al. (2007) found that performance expectancy has a significant impact on intention to use. Further, Im, Hong, and Kang (2011) provide empirical support that performance expectancy significantly determined behavioural intention.

Wang et al. (2009) surveyed 330 respondents in Taiwan and found that performance expectancy was the strongest predictor of behavioural intention to use M-learning. This is further supported by Gunawardana and Ekanayaka (2009) who investigated the determinants affecting the intention to use M-learning among medical representatives in Sri Lanka. This study found a significant positive correlation of performance expectancy and M-learning use intentions.

According to Jairak et al. (2009) more than half of the 390 Thai university students surveyed are unfamiliar but have a good perception of M-learning and the results show a significant positive relationship between performance expectancy and acceptance level of M-learning. The same result was also found by Nassuora (2012) who examined the possibility of acceptance in M-learning and studied the main determinants that affect M-learning among higher education students in Saudi Arabia.

Based on past empirical studies, performance expectancy has a significant influence with user acceptance level towards the use of M-learning (Gunawardana & Ekanayaka, 2009; Jairak et al., 2009; Nassuora, 2012; Wang et al., 2009). Thus, the following hypothesis is proposed:

H_o: There is no relationship between performance expectancy and the intention to use M-learning.

H_1: There is a relationship between performance expectancy and the intention to use M-learning.

2.2.4 Effort Expectancy and Acceptance Level of M-learning

Effort expectancy can be described as the degree of ease with which potential users can grasp the use of a system (Venkatesh et al., 2003). Therefore, ease of use in this context means that users require only little technical knowledge to operate the technology (Alsheikh & Bojei, 2012).

In the context of information technology such as e-learning and Web-based learning system, the effort expectancy has a positive effect on behavioural intention. This is support by Liao, Yu, and Yi (2011) which investigates the determinants of e-learning acceptance that showed the effort expectancy is positive influence on behavioural intention. Moreover, Marchewka, Liu, and Kostiwa (2007) study the students' perception using Web-based learning system such as Blackboard regarding effort expectancy which shows there is a significant relationship between effort expectancy and intention to use.

Furthermore, research indicates that effort expectancy's effect will be strong during the initial stages of using a system and will decrease over time as the user gains experience (Venkatesh et al., 2003). This is support by Jairak et al. (2009) studied the acceptance of M-learning in higher education students in Thailand and also examined factors that have a positive relationship with behavioural intention to use M-learning. They found that effort expectancy has a significant positive relationship with acceptance of M-learning because more than half of the students in this study were unfamiliar with M-learning but still had good perceptions that it would be easy to use.

In another research, Gunawardana and Ekanayaka (2009) highlighted that effort expectancy has a significant relationship between effort expectancy and intention to use M-learning in Sri Lanka. The same result has been found by Lowenthal (2010) which examined the determinants that affect the behavioural intention of students to use M-learning. Apart from that, Wang et

al. (2009) indicate that the effort expectancy had a significant positive effect on behavioural intention to use M-learning. This is due to the M-learning still in its early infancy, effort expectancy is expected to be a critical determinant of behavioural intention to use M-learning (Wang et al., 2009).

Based on the past empirical studies, effort expectancy has a significant influence with acceptance level towards the use of M-learning (Gunawardana & Ekanayaka, 2009; Jairak et al., 2009; Lowenthal, 2010; Wang et al., 2009). Thus, the following hypothesis is proposed:

H_0: There is no relationship between effort expectancy and the intention to use M-learning.

H_1: There is a relationship between effort expectancy and the intention to use M-learning.

2.2.5 Social influence and Acceptance Level of M-learning

Venkatesh et al. (2003) defined social influence as the extent that a person is persuaded by intimate friends and family members to use new information technology systems. In addition, the decision of the learner is also influenced by others, such as peer students or instructors (Miller, Rainer, & Corley 2003).

Umrani-Khan and Iyer (2009) stated that social influence is the result of two combined factors, which are subjective norm and image. Subjective norm is defined as "the individual's perception of a other's opinion about their performance of the behaviour" (Fishbein & Ajzen, 1975, p.302), while image is defined as "the degree to which adoption or usage of the innovation is perceived to enhance one's image or status in one's social system" (Moore & Benbasat, 1991, p.195).

A research by Lu, Liu, and Liao (2005) found that image was a critical factor to the nonexperienced user's intention to use e-learning as individuals could avoid performing an image which is left behind of technology or out of date (Isaac, Leclercq, & Besseyre Des Horts, 2006). While a study done by Grandon, Alshare, and Kwan (2005) showed that subjective norm was found to be a significant factor in affecting university students' intention to use e-learning.

According to Yang, Moon, and Rowley (2009) subjective norm was found to have a positive influence towards image as important people such as family members and close friends believe that they should perform such behaviour as it would elevate their status in the group. Due to this, a person may think that IT will lead to better job performance, although result is based on image development rather than the attributes of the IT (Venkatesh & Davis, 2000). Thus, one may perceive that by using M-learning would improve their learning although it only benefits image enhancement rather than using it.

Past studies done by Gunawardana and Ekanayaka (2009); Rogers (2003); Venkatesh and Davis (2000); Wang et al. (2009) found that social influence is significant in shaping an individual's intention to use new technology. When the numbers of M-learning users reaches a point of critical mass, the next wave of later M-learning adopters will likely grow rapidly (Rogers, 2003). This shows that when M-learning is popular in the community, individuals tend to participate in M-learning as part of the community's culture. Venkatesh et al. (2003) indicated that social influence is strongest during initial stages of technology use and decreases over time.

Wang et al. (2009) also found a positive effect on social influence and intention to use M-learning among Taiwanese employees. The same result was also obtained by Jairak et al. (2009) which isa positive relationship between social influence with acceptance level. Gunawardana and Ekanayaka

(2009); Venkatesh and Davis (2000) showed that the significant impact on the intention to use M-learning is due to social influence.

According to Cheng et al. (2011) an investigation on the employees of the three major occupations in Taiwan found that social influence has a positive effect on behavioural intention to use M-learning and they were mostly motivated by social influence.

Alawadhi and Morris (2008) found that peer influence is more significant in situations where users have limited experience in using information systems (e.g. mobile devices). The research highlights the importance of ensuring a positive experience with information system through the influence of peers or those considered important to users.

Based on the past empirical studies, social influence has shown a significant influence with acceptance level towards the use of M-learning (Gunawardana & Ekanayaka, 2009; Rogers, 2003; Venkatesh & Davis, 2000; Wang et al., 2009). Thus, the following hypothesis is proposed:

H_0: There is no relationship between social influence and the intention to use M-learning.

H_1: There is a relationship between social influence and the intention to use M-learning.

2.2.6 Perceived Playfulness and Acceptance Level of M-learning

Perceived playfulness is defined as "a state of mind that contains three aspects: the degree to which the individual (1) perceives that his or her interest is focused on the interaction with M-learning (i.e., concentration); (2) is curious all through the interaction (i.e., curiosity); and (3) finds the interaction intrinsically enjoyable or interesting (i.e., enjoyment)" (Wang et al., 2009, p. 99).

Perceived playfulness which is one of the intrinsic factors of motivation in technology acceptance has been included in several research papers on technology acceptance levels (Agarwal & Karahanna, 2000; Huang et al., 2007; Moon & Kim, 2001; Wang et al., 2009). One of the reasons to include perceived playfulness is that intrinsic motivation occurs when individuals become completely absorbed in a technology, with the objective of getting pleasure from it (Agarwal & Karahanna, 2000).

Perceived playfulness is widely used to measure people's perception of education innovation (Chiu & Wang, 2008; Wang et al., 2009). A research shows that playful and hedonic features in the design of digital learning systems should be emphasized (Kiili, 2005). It is more likely that students will use M-learning if they found it intrinsically enjoyable or interesting (Gunawardana & Ekanayaka, 2009).

Perceived playfulness can be used to forecast users' intention to use M-learning. Several authors found a significant positive relationship between perceived playfulness and intention to use M-learning (Huang, et al., 2007; Phuangthong & Malisawan, 2005; Venkatesh & Brown, 2001; Wang et al., 2009). Few studies on e-learning support the impact of perceived playfulness on intention to use as well (Lee, Cheung, & Chen, 2005; Liaw, Huang, &

Chen, 2007). A positive relationship has been found between perceived playfulness and mobile Internet acceptance in Korea (Cheong & Park, 2005). Moreover, perceived playfulness is also argued to have significance on behavioural intention to use in e-learning research (Lee et al., 2005).

Based on the past empirical studies, perceived playfulness has a significant influence with acceptance level towards the use of M-learning (Huang et al., 2007; Phuangthong & Malisawan, 2005; Venkatesh & Brown, 2001; Wang et al., 2009). Thus, the following hypothesis is proposed:

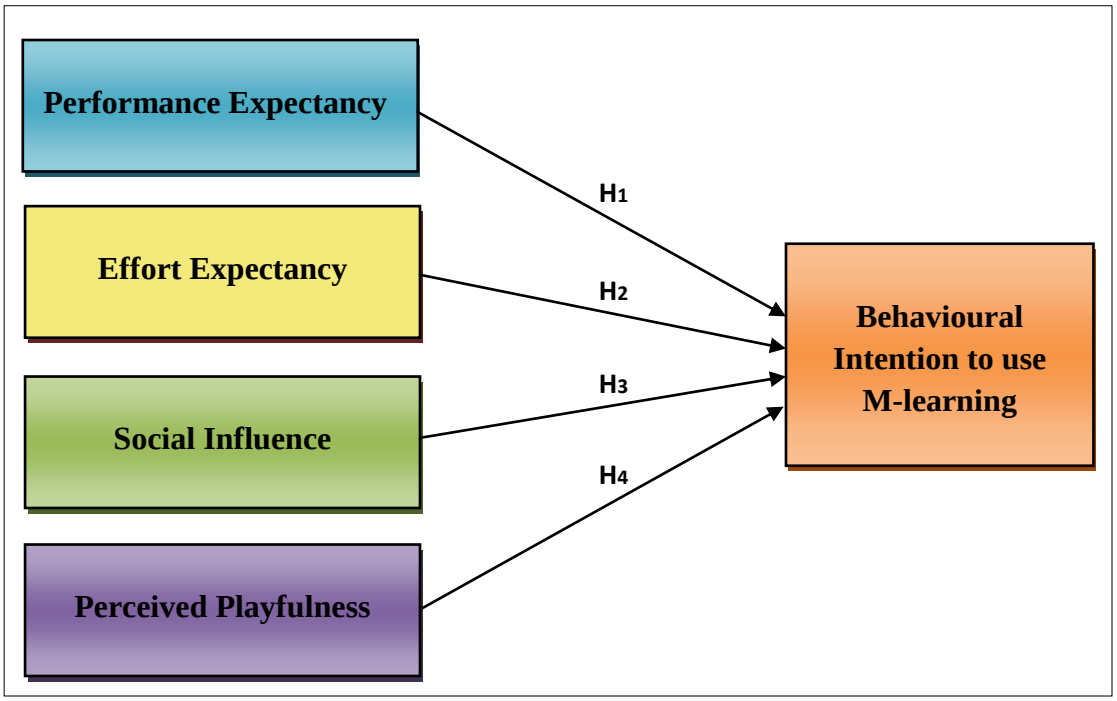
H_0: There is no relationship between perceived playfulness and the intention to use M-learning.

H_1: There is a relationship between perceived playfulness and the intention to use M-learning.

2.3 Proposed Research Model

The proposed research model consists of four independent variables (1) Performance Expectancy, (2) Effort Expectancy, (3) Social Influence, (4) Perceived Playfulness and an independent variable of Behavioural Intention.

Figure 2.1: Proposed Research Model



Source: Developed for the Research

2.4 Hypotheses Development

The hypotheses of the study are developed as shown in Table 2.1:

Table 2.1: Hypotheses of the Study

H_0 : There is no relationship between performance expectancy and the intention to use M-learning H_1 : There is a relationship between performance expectancy and the intention to use M-learning
H_0 : There is no relationship between effort expectancy and the intention to use M-learning H_2 : There is a relationship between effort expectancy and the intention to use M-learning
H_0 : There is no relationship between social influence and the intention to use M-learning H_3 : There is a relationship between social influence and the intention to use M-learning
H_0: There is no relationship between perceived playfulness and the intention to use M-learning H_4 :There is a relationship between perceived playfulness and the intention to use M-learning

Source: Developed for the Research

2.5 Conclusion

Review of the theoretical foundation and past studies was provided in this chapter. From the past studies review, the research model and hypotheses were developed. The research methodology would then be provided in Chapter 3.

CHAPTER 3: RESEARCH METHODOLOGY

3.0 Introduction

After developing the research model and hypotheses from the past studies review in Chapter 2, this chapter aims to describe the research design, population, sample, and sampling procedure, data collection methods, variable and measurement, and data analysis techniques.

3.1 Research Design

In this research, quantitative method is being used. This research paper is going to determine whether (1) performance expectancy, (2) effort expectancy, (3) social influence, and (4) perceived playfulness have relationship with behavioural intention to use M-learning. According to Smith (1988) quantitative research involves tabulating and gauging events and performing statistical studies of numerical data. Furthermore, quantitative research also clearly and precisely specifies both the independent and dependent variables under investigation. By using quantitative approach in the research, it can make a more convincing interpretation associated with the result derived from the questionnaire (Bernard, 2000). In addition, one of the real benefits of quantitative methods is the ability to "use smaller groups of people to make inferences about larger groups that would be prohibitively expensive to study" (Holton & Burnett, 1997, p.71).

Cross-sectional study has been used in this study, which indicates that the data is collected in a single point of time (Zikmund, 2003). This is because according to Saunders, Lewis, and Thornhill (2009) a cross-sectional study is more appropriate for

the research that has to be completed in a limited time period and it will be helpful in explaining the relationship between each determinants in the research.

3.2 Data Collection Method

Both primary and secondary data are collected for this research and these data are used to answer the hypotheses and research questions. All the relevant data are analyzed and a conclusion has been drawn from the findings.

3.2.1 Primary Data

In this research, the questionnaire method has been chosen. A questionnaire is a research instrument containing a series of questions for gathering information and feedback from respondents. This research paper used the questionnaire method because it can gather the data from a potentially large number of respondents. It is also inexpensive and often provides standardized answers for respondents to choose from that make it uncomplicated to compile data (Saunders et al., 2009).

3.2.2 Secondary Data

Secondary data for this study was mainly gathered from journal articles, books, newspaper articles, and internet. Reviewing journal articles on similar studies has significantly helped in developing the hypothetical framework for this study. In addition, findings from previous researches conducted in the same area have served as valuable sources of supporting material, forming the backbone of the secondary data.

3.3 Sampling Design

3.3.1 Target Population

Population is an identifiable total set of basis of interest being investigated by a researcher (Zikmund, 2003). However, in specific, target population is defined as the group about which the researchers are interested in making inferences or to generalize the conclusions (Henry, 1990). The target populations for this research are the group of public universities students in Klang Valley, Malaysia.

3.3.2 Sampling Frame and Sampling Location

Sample is the subset of the population. According to Zikmund (2003) the advantages of using samples instead of the population are to save budget and time, and to be able to obtain results in a shorter period by analyzing and making conclusions based on a small part of the whole population.

Ministry of Higher Education (2011) has presented the data of 415,289 local students enrolled in Klang Valley's public university. However, in order to get a more accurate figure, the research will be conducted based on the latest list of students' emails collected from the six public universities.

The sampling frame comprises the enrollment of students in the aforesaid public universities at the time of this research. There are approximately of 448, 512 students in these universities based on the full number of students' email address collected. The sampling frame will be the list of students of six public universities in the Klang Valley: Universiti Malaya, Universiti Kebangsaan

Malaysia, Universiti Putra Malaysia, Universiti Islam Antarabangsa Malaysia, Universiti Pertahanan Nasional Malaysia and Universiti Teknologi MARA.

3.3.3 Sampling Elements

The students of the six public universities in Klang Valley are the respondents for this research since the research is aim to test the M-learning acceptance behavior of students.

3.3.4 Sampling Technique

This research is using probability sampling, whereby each target population may have a fixed probabilistic chance of being selected to become the sample (Saunders et al., 2009). Under the probability sampling, random sampling technique is being used. It is a type of sampling technique that the samples are being selected randomly from the sampling frame (Saunders et al., 2009).

In this research, a full list of public university students e-mail address is obtained from each of the public university in Klang Valley. Based from the list obtained, the sample population has been selected based upon the online random number generator (computer software) called Research Randomizer *(*Urbaniak & Plous, 2011*).*

Random sampling method is chosen because of its ability to select sample without bias and therefore can be considered to be representative of the whole population. Moreover, this type of technique is argued by the authors to be best used when the sample frame is easily accessible and mainly focused in one geographical area (Klang Valley) like what is done in this research (Saunders et al., 2009).

3.3.5 Sampling Size

In estimation of the optimal sample size, Sample Size Calculator is used for this research at which developed by Creative Research System (2012). It is an example of stand-alone program to help find an appropriate balance among study design, assumptions and statistical power (Confalonieri, Acutis, Bellocchi & Genovese, 2007). This tool has been recommended by some of the authors in estimation of sample size (Bartlett, Kortlik, & Higgins, 2001; Bradley, 2007). This tool is run based on the formula of Cochran (1977). This formula is still in use for current research in estimating sample size for example in the articles of Armand and Motamed (2012). The formula is at follow:

Table 3.1: Formula for Estimating Sample Size

$$\text{Sample Size} = \frac{Z^2 pq}{e^2}$$

Z^2 = Horizontal line of the normal curve that cuts off an area at the tails (1 – equals the desired confidence level)

e = desired level of precision (confidence interval/margin of error),

p = the estimated proportion of an attribute that is present in the population,

q = 1-p(the estimated proportion of an attribute is not present in population).

The value for Z is found in statistical tables which contain the area under the normal curve.

Source: Cochran, W. G. (1977). *Sampling techniques* (3rd ed.). New York: John Wiley & Sons.

Generally, as cited in Bartlett et al. (2001), Krejcie and Morgan (1970) stated that 5% margin of error is acceptable in educational and social research. In addition, 95% confidence level is commonly used by most of the researchers (Hayway Group Ltd, 2009).

Hence, 5% Margin of error and 95% confidence interval is inserted to the calculator. The results have finally shown 384 samples size is needed for this research. As cited in Sekaran and Bougie (2010), Krejcie and Morgan (1970) provided the table where sample size of 384 is deemed to be appropriate, the population size greater than 75,000 will need 384 samples (Please refer Appendix F).

3.4 Research Instrument

Self-administrated questionnaires are distributed by using online method. Zikmund (2003) stated that using online questionnaires can lower distribution and processing time, provide quick distribution and response, and lessen handling of questionnaire papers. In addition, it will be easier for researchers to send the questionnaires to target respondents in different areas.

Some researchers found that online surveys have low response rates (Couper, 2000; Dey, 1997; Moss & Hendry, 2002). However, Matz (1999) and Saphore (1999) found in comparative research studies that there were similar pattern of responses between an identical surveys in paper form with web survey. Moreover, Schonlau, Fricker, and Elliott (2002) noted there is evidence that data collected over the Internet yield more completeness and quality than data obtained from more traditional methods such as post mail. Several researchers who have used the Internet to conduct surveys support Schonlau et al. (2002) who noted higher response-rates, completeness and data quality.

Past studies have generally reported that electronic surveys produce response rate of 37.2% (Kwak & Radler, 2002). In current research, the sample size of the research is 384. In order to reach this target, number of survey to be sent has been estimated based on the average response rate from empirical studies by re-grossing the target sample size (approximately 1000 sets).

In this research, follow-up reminder has been sent to participants and vouchers are randomly rewarded to 20 participants with the objective to increase the response rate as Kittleson (1997) was assertive in emphasizing the effectiveness of follow-up notices to electronic survey efforts and he found when there is a follow-up reminder will increase the response rate for e-mail surveys. Moreover, response rate in online surveys will be most significant if vouchers, the closest online alternative to cash, are used as an incentive (Deutskens, Ruyter, Wetzels, & Oosterveld, 2004).

Before questionnaires are being used to collect data, pilot test is carried out to test the clarity, ease of understand, normality and reliability of the questions. This is to ensure there will be no problem for respondents to answer all the questions (Saunders et al., 2009; Van Teijlingen, Rennie, Hundley, & Granham, 2001). According to Monette, Sullivan and DeJong (2002) twenty participants for pilot test is enough to test the validity of the survey's content. Hence, twenty participants have been chosen for the pilot test of this research.

Table 3.2: Reliability Statistics (Pilot Test)

Variables	**Number of Item**	**Reliability Test**
Performance Expectancy	6	0.849
Effort Expectancy	6	0.904
Social Influence	6	0.777
Perceived Playfulness	6	0.846

Source: Developed for the Research

Table 3.3: Test of Normality (Pilot Test)

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
BI	.162	20	.179	.908	20	.058

a. Lilliefors Significance Correction

Source: Developed for the Research

Table 3.1 and Table 3.2 depict results of reliability test and normality test from pilot test conducted. The ranges of Cronbach's alpha of the variables are 0.777 to 0.904. Effort expectancy has the highest Cronbach's alpha, which is 0.904 while social influence has a Cronbach's alpha of 0.777. With a Cronbach's alpha of more than 0.8, independent variables are considered good and highly reliable as they are able to produce consistent output. Performance expectancy and perceived playfulness achieved Cronbach's alpha of 0.849 and 0.846 respectively. All of the independent variables in this research are considered acceptable and reliable with Cronbach's alpha of more than 0.7. Besides that, the pilot test shows that data are normal because the p-value is 0.179, which is more than 0.05.

3.5 Variable and Measurement

In Section A of the questionnaires, nominal type and ordinal type questions are being used to collect demographic data of respondents such as gender, age, education and marital status.

In Section B and Section C, five-point Likert Scale is applied to measure the independent variables and dependent variable of the study. There are four independent variables selected in this research which are (1) performance expectancy, (2) effort expectancy, (3) social influence and (4) perceived playfulness definition of the four independent variables (Please refer to Appendix B). The dependent variable of this research is behavioural intention to use M-learning. Behavioural intention refers to individual decisions regarding future system use (Venkatesh et al., 2003). A total of 24 questions will be asked to test the four independent variables, and the dependent variable will be tested through a total of five questions. All of these questions will be tested by using the five-point Likert Scale which range from (1) strongly disagree, (2) disagree, (3) neutral, (4) agree and (5) strongly agree. Target respondents are required to indicate their agreement or disagreement towards the items asked.

3.6 Data Processing

A total of 1000 questionnaires were distributed to the public university students in Klang Valley. Out of the 1000 sets, 403 sets were returned whereas 597 sets were not returned. 5 sets of returned questionnaires consisting of outliers were removed to avoid distortions in the data analysis. After removal of outliers, a total of 398 questionnaires were used to conduct data analysis**,** thus giving the total respond rate of 39.8 per cent.

Data were entered into the Statistical Package for the Social Sciences (SPSS) with considerable care to minimise human errors. Data entered were rechecked to ensure consistencies with the data in the questionnaires and the data analysis software.

3.7 Data Analysis Techniques

In this research, data analysis will be performed by using SPSS.

3.7.1 Descriptive Analysis

Mean and standard deviation of every item in the questionnaire would be calculated and presented. Furthermore, demographic profile of target respondents (gender, age group, marital status, and current education pursued) are described in frequency and percentage by using tables, charts and written explanations in section 4.1.

3.7.2 Scale Measurement

Normality and reliability test will be carried out to test all of the research samples. Normality test was conducted to ensure that the data are normally distributed. Kolmogorov-Smirnov test is used in this research because it is more suitable for larger sample size, which is n > 50 samples (Fasano & Franceschini, 1987). According to Saunders et al. (2009) data are considered normal if the p-value is more than 0.05. For reliability test, Hair, Black, Babin, and Anderson (2010) stated that it is conducted to ensure the consistency of findings from data collection techniques. Coefficient alpha (a) is the most commonly applied estimate of a multiple-item scale's reliability. Although

coefficient alpha does not address validity, many researchers use alpha as the sole indicator of a scale's quality.

Table 3.4 Rules of Thumb about Cronbach-Alpha Coefficient Size

Alpha Coefficient Range	**Strength of Association**
< 0.6	Poor
0.6 to < 0.7	Moderate
0.7 to < 0.8	Good
0.8 to < 0.9	Very Good
≥ 0.9	Excellent

Source: Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, *16*(3), 297-334.

According to the rule of thumb about Cronbach-Alpha**,** coefficient alpha ranges from 0 to 1. A score of less than 0.6 is considered poor and a score of over 0.8 is considered good. Researchers generally consider an alpha of 0.7 as a minimum, although lower coefficients may be acceptable depending on the research objectives. An acceptable level of reliability shows respondents are answering the questions of survey in a consistent manner (Hair et al., 2010).

3.7.3 Inferential Analysis

Inferential analysis deal with drawing conclusions and making predictions about the properties of a population based on information obtained from a sample. In this research, Pearson's correlation was used to evaluate the strength of the association between an independent variable and a dependent variable. According to Table 3.5, the coefficient of correlation ranges from -1 to +1. The value of +1 is considered to be of perfect positive relationship and signifies that the independent variable has a direct relationship with the dependent variable and vice versa. A value of 0 means that there is no relationship between the two variables while a value that is close to 1 implies that the two variables are strongly correlated (Saunders et al., 2009).

Table 3.5 Correlation Coefficient

Value	Correlation coefficient
-1	Perfect negative
-0.7	Strong negative
-0.3	Weak negative
0	Perfect independent
0.3	Weak positive
0.7	Strong positive
1	Perfect positive

Source: Saunders, M., Lewis, P., & Thornhill, A. (2009). *Research methods for business students* (5th ed.). England: Pearson Education Limited.

Moreover, multicollinearity test also has been carried out to test whether there is any correlation between the four independent variables in this research. Hair et al. (2010) stated that a multicollinearity problem exists when independent variables are strongly correlated to each other. The correlation value that more than 0.9 is considered high correlations.

Multiple regression analysis has been used to test the relationship between multiple independent variables (performance expectancy, effort expectancy, social influence and perceived playfulness) to a single dependent variable (intention to use M-learning). The R value (correlation of coefficient) describes the degree of correlation between independent variables and dependent variable. R^2 (coefficient of determination) is a measure designed to indicate the strength of the impact of the independent variables on the dependent variable. However, there are some assumptions must be met when carry out the multiple regression analysis, such as: (1) the relationship between dependent and independent variables should be linear, (2) all the data must be normally distributed, (3) the data values for the dependent and independent variables have equal variances, and (4) there is no multicollinearity problem between two or more independent variables (Saunders et al., 2009).

3.8 Conclusion

The research methodology and data analyzing techniques were provided in this chapter. Chapter 4 would then provide the result yielded from the survey.

CHAPTER4: DATA ANALYSIS

4.0 Introduction

In chapter 4, the findings of the research will be disclosed and analysed. Data from 398 questionnaires are analysed using SPSS 16.0. The results are interpreted in order to find the relationship between the independent variables which include (1) performance expectancy, (2) effort expectancy, (3) social influence, (4) perceived playfulness and the dependent variable which is behavioural intention. Descriptive analysis, scale measurement and inferential analysis are shown in the following sections of the chapter.

4.1 Descriptive Analysis

4.1.1 Demographic Profile of the Respondents

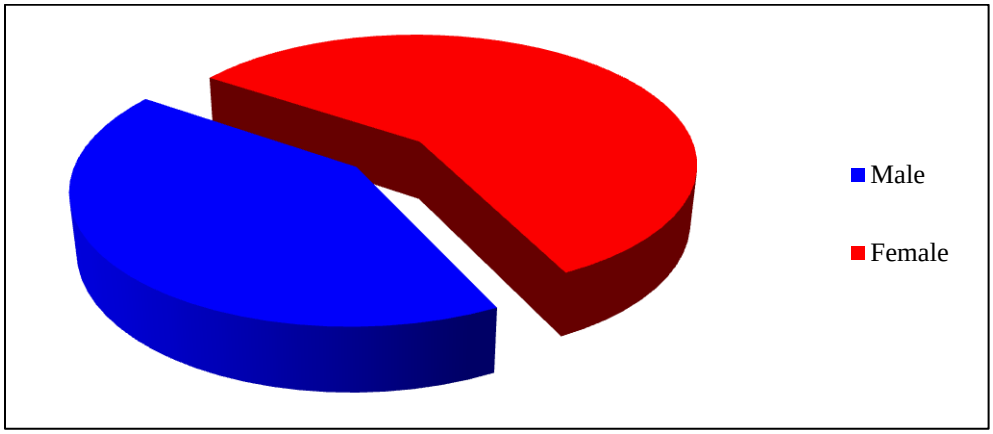
The demographic profile of the surveyed respondents is presented from Table and Figure 4.1 to 4.6. It includes 4.1 gender, 4.2 age group, 4.3 marital status, 4.4 current education pursued, 4.5 how often do you have your mobile device with you and 4.6 where do you normally use your mobile device. The total sample is made up of 398 respondents.

Table 4.1: Gender

	Frequency	Percentage
Male	166	41.7
Female	232	58.3
Total	398	100.0

Source: Developed for the Research

Figure 4.1: Gender



Source: Developed for the Research

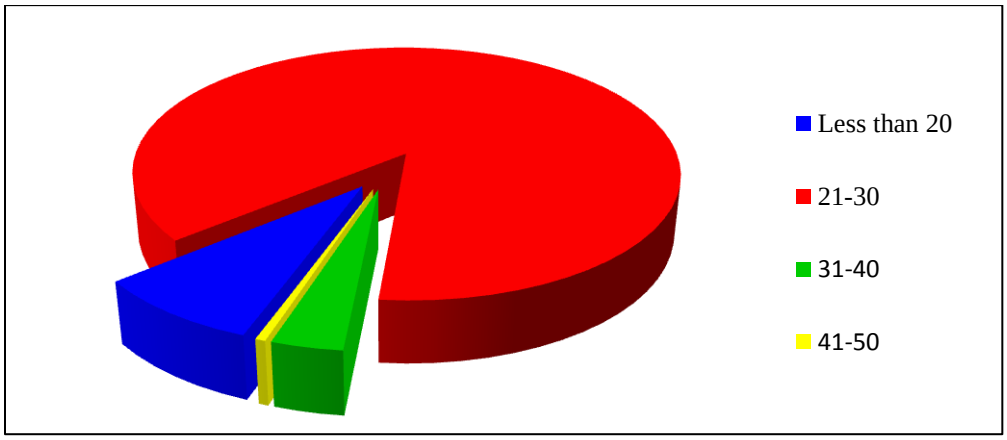
According to Table 4.1 and Figure 4.1, 166 out of the 398 respondents are males while 232 of them are females. This shows that female respondents are higher than male respondents by 16.6%. The e-mail list obtained from the six public universities in Klang Valley also shows that the number of female in public university is higher than male. Thus, the chances female being selected by the Research Randomizer will be higher.

Table 4.2: Age

	Frequency	Percentage
Less than 20	34	8.5
21-30	348	87.5
31-40	14	3.5
41-50	2	0.5
Total	398	100.0

Source: Developed for the Research

Figure 4.2: Age



Source: Developed for the Research

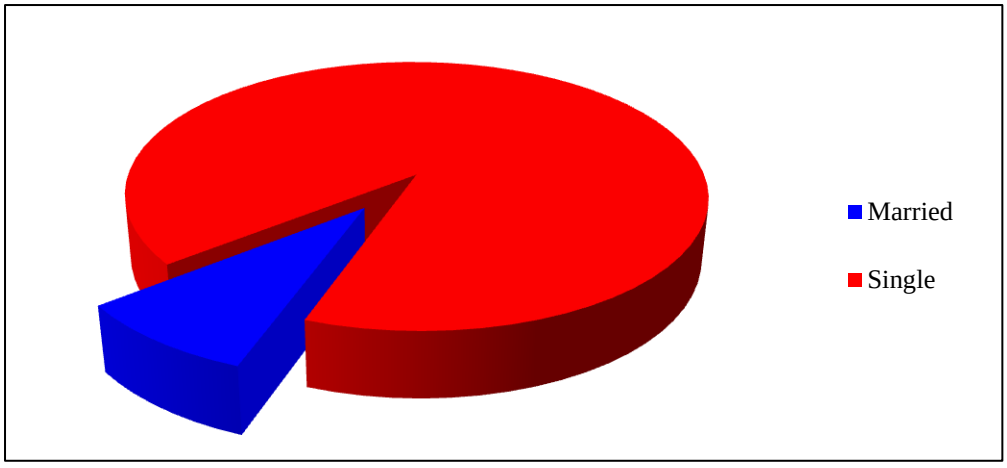
The distribution of the respondents according to their age group is presented in Table 4.2 and Figure 4.2. 8.5% of respondents are below 20 years old; 87.5% of respondents are between 21-30 years old; 3.5% of respondents are between 31-40 years old and only 0.5% of respondents are between 41-50 years. Majority of the respondents are between 21-30 years old.

Table 4.3: Marital Status

	Frequency	Percentage
Single	371	93.2
Married	27	6.8
Total	398	100.0

Source: Developed for the Research

Figure 4.3: Marital Status



Source: Developed for the Research

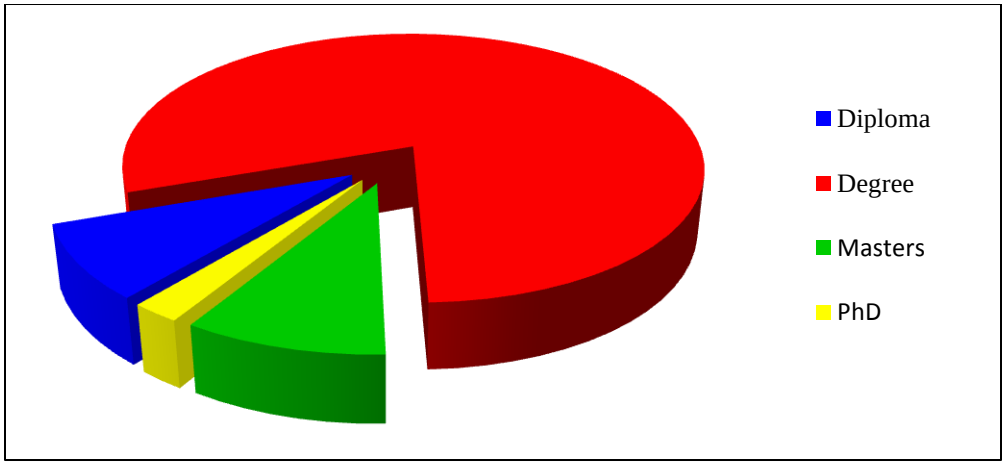
Table 4.3 and Figure 4.3 above represent the frequency and percentage of the respondents' marital status. There were a total of 398 respondents. 371 respondents are single whereas 6.8% (27) of the respondents are married. This indicates that respondents of six public universities in the Klang Valley majority of them are still single.

Table 4.4: Current Education Pursued

	Frequency	Percentage
Diploma	34	8.5
Degree	318	79.9
Masters	37	9.3
PhD	9	2.3
Total	398	100.0

Source: Developed for the Research

Figure 4.4: Current Education Pursued



Source: Developed for the Research

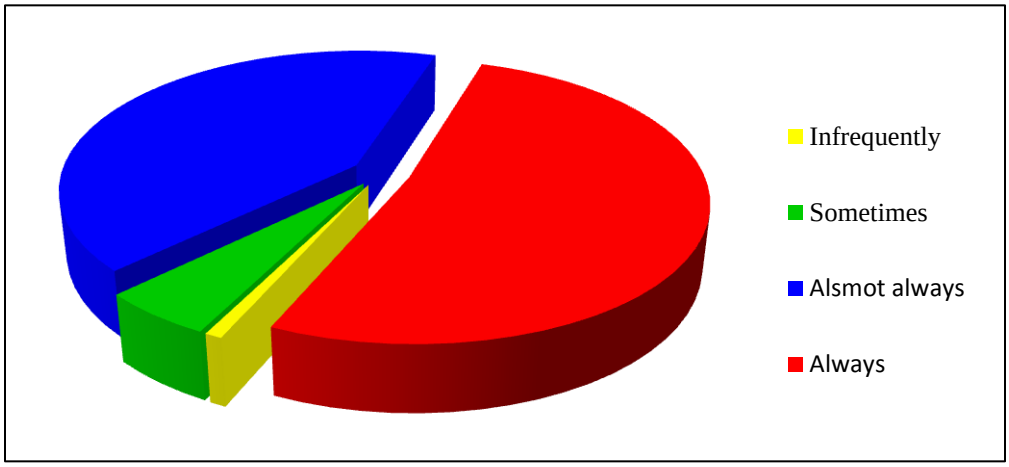
In Table 4.4 and Figure 4.4 shows that 34 respondents which is a percentage of 8.5% are diploma level where 318 were from degree and 37 which stands for a percentage of 9.3% are masters. PhD level has the least number as only 9 respondents pursued it. This shows that most of the respondents in public university are degree holders.

Table 4.5: How Often Do You Have Your Mobile Device With You?

	Frequency	Percentage
Infrequently	3	0.8
Sometimes	21	5.3
Almost always	168	42.1
Always	206	51.8
Total	398	100.0

Source: Developed for the Research

Figure 4.5: How Often Do You Have Your Mobile Device With You?



Source: Developed for the Research

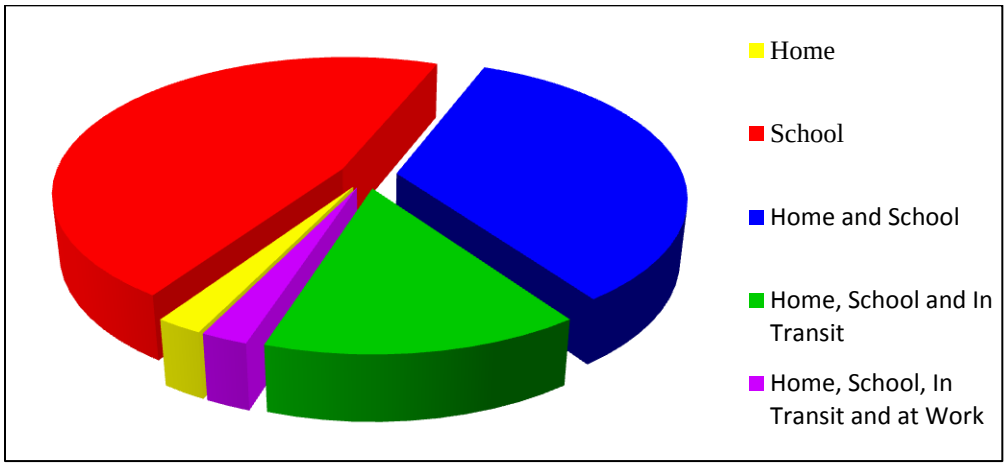
A question of how often the respondents would have their mobile device with them had choices of “infrequently”, “sometimes”, “almost always” and “always”. The highest choice is always which has 206 respondents, while 168 respondents are choose almost always. Participants whom choice sometimes were 21 which is 5.3% while respondents whom choice infrequently were 3 (0.8%) respondents. This presents that most of the respondents are often have mobile device with them.

Table 4.6: Where Do You Normally Use Your Mobile Device?

	Frequency	Percentage
Home	9	2.2
School	185	46.6
Home and School	136	34.2
Home, School and In Transit	59	14.8
Home, School, In Transit and at work	9	2.2
Total	398	100.0

Source: Developed for the Research

Figure 4.6: Where Do You Normally Use Your Mobile Device?



Source: Developed for the Research

For the question of where respondents normally use their mobile device have choices of "home", "school", "in transit", "at work" and "other" which allow respondents choose more than one choice. From the choices of home, home and school, school, in transit and at work have the same numbers which are 9 respondents which is 2.2%. While a number of 185 (46.6%) respondents choose school are the highest. 136 respondents which a total of 34.2% choose home and school and 59 respondents which are 14.8% normally use their

mobile device at home, school and in transit. This showed that most of the respondents are normally use their mobile device at school.

4.1.2 Central Tendencies Measurement of Constructs

Mean and standard deviation of the variables were showed in Table 4.7. Mean was calculated by using the average result from the scales provided in the questionnaires coded from 1 to 5 which indicate "strongly disagree - 1" to "strongly agree" - 5. The mean values of all the variables range from 3.6725 to 4.0291. This shows that the variables are more towards neutral and agreed. The standard deviations for all of the variables were less than 1.

Effort expectancy has the highest mean of 3.9615 among all variables; it shows that the respondents agree to the effort expectancy from the mobile learning. Performance expectancy and perceived playfulness has the equal mean of 3.8559. Social influence has the lowest mean of 3.6725; however, it is still in the range of neutral to agree. The dependent variable, behavioural intention, has a mean of 4.0291.

Table 4.7: Central Tendencies Measurement of Constructs

Items	Mean	Std. Deviation
Behavioural Intention, DV	4.0291	0.71610
Performance Expectancy, IV1	3.8559	0.69214
Effort Expectancy, IV2	3.9615	0.76366
Social Influence, IV3	3.6725	0.80995
Perceived Playfulness, IV4	3.8559	0.68951

Source: Developed for the Research

4.2 Scale Measurement

4.2.1 Normality Assumption

Table 4.8 shows the result for test of normality with the level of significant. The normality test of the distribution of residual was carried out. Kolmogorov-Smirnov test is used in this research because it is more suitable for larger sample size, which is more than 50 samples (Fasano & Franceschini, 1987). According to Saunders et al. (2009) data are considered normal because the p-value (0.200*) is more than 0.05., which indicates that normality could not be assumed.

Table 4.8: Test of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Standardized Residual	.032	398	.200*	.996	398	.415

b. Lilliefors Significance Correction

*. This is a lower bund of the true significance

Source: Developed for the Research

4.2.2 Reliability Test

Table 4.9 shows the reliability coefficients or Cronbach's alpha for every independent variable and dependent variable. Overall, the range of Cronbach's alpha of the variables are 0.882 to 0.925. Social Influence and effort expectancy have achieved the highest Cronbach's alpha, which is at 0.920 while performance expectancy has a Cronbach's alpha of 0.919. With a Cronbach's alpha of more than 0.9, three of these independent variables are good and highly reliable as they are able to produce consistent output. Meanwhile, the dependent variable of behavioural intention has high Cronbach's alpha of 0.925 which also indicate high reliability of the variable. Perceived playfulness achieved Cronbach's alpha of 0.882 which is still in reliable range. In short, all variables presented in research are reliable as they have exceed the minimum requirement of Cronbach's alpha of 0.7 which generally accepted by most of researchers (Hair et al., 2010).

Table 4.9: Reliability Statisctic

Variables	No. of Item	Cronbach's Alpha
Behavioural Intention	5	0.925
Performance Expectancy	6	0.919
Effort Expectancy	6	0.920
Social Influence	6	0.920
Perceived Playfulness	6	0.882

Source: Develop for the Research

4.2.3 Multicollinearity Test

Result in Table 4.10 shows that there is no multicollinearity problem among all the IVs in this study as the highest correlation between IV is less than 0.9 (Hair et al., 2010), which is 0.765 between performance expectancy and effort expectancy.

Table 4.10: Multicollinearity

		PE	EE	SI	PP	BI
PE	Pearson Correlation	1	.765**	.667**	.674**	.776**
	Sig. (2-tailed)		.000	.000	.000	.000
	N	398	398	398	398	398
EE	Pearson Correlation	.765**	1	.755**	.673**	.792**
	Sig. (2-tailed)	.000		.000	.000	.000
	N	398	398	398	398	398
SI	Pearson Correlation	.667**	.755**	1	.696**	.709**
	Sig. (2-tailed)	.000	.000		.000	.000
	N	398	398	398	398	398
PP	Pearson Correlation	.674**	.673**	.696**	1	.697**
	Sig. (2-tailed)	.000	.000	.000		.000
	N	398	398	398	398	398
BI	Pearson Correlation	.776**	.792**	.709**	.697**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	398	398	398	398	398

**. Correlation is significant at the 0.01 level (2-tailed).

Note: PE: Performance Expectancy; EE: Effort Expectancy; SI: Social Influence; PP: Perceived Playfulness; BI: Behavioural Intention.

Source: Developed for the Research

4.3 Inferential Analysis

4.3.1 Pearson's Correlation Analysis

As indicated in the Table 4.11, all the associated pairs of variables are significant at level 0.01 (less than 0.01). Hence, all the hypothesized assumptions are statistically significant at level $p < 0.01$. The analysis result implies that PE ($r = 0.776$, $p < 0.01$), EE ($r = 0.792$, $p < 0.01$), SI ($r = 0.709$, $p < 0.01$) and PP ($r = 0.697$, $p < 0.01$) are all positively and significantly correlated with BI.

Table 4.11: Pearson's Correlation

		PE	EE	SI	PP
BI	Pearson Correlation	.776**	.792**	.709**	.697**
	Sig. (2-tailed)	.000	.000	.000	.000
	N	398	398	398	398

**. Correlation is significant at the 0.01 level (2-tailed).

Note: PE: Performance Expectancy; EE: Effort Expectancy; SI: Social Influence; PP: Perceived Playfulness; BI: Behavioural Intention.

Source: Developed for the Research

4.3.2 Multiple Linear Regressions

In this research, the multiple regression analysis is used as a statistical technique to analyze the linear relationship between a dependent variable and multiple independent variables (Hair, Black, Babin, Anderson, & Tatham 2006). In conducting multiple regression analysis, there are three steps which

including (i) Statistical significance of each coefficient, (ii) Nature of relationship and (iii) Strength of relationship.

According to Hair, Babin, Money and Samouel (2003), the test is significant if the p-value is less than 0.05. The beta coefficient is used to determine which independent variables have the most significant influence on the dependent variable (Hair et al., 2006). Lastly, the multiple r square is used to determine the strength of the relationship between all the independent variables collectively and the dependent variable (Hair et al., 2006)

Table 4.12: Regression Predicting Behavioural Intention

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.411	.119		3.441	.001
	PE	.331	.045	.320	7.275	.000
	EE	.325	.045	.346	7.163	.000
	SI	.105	.039	.119	2.690	.007
	PP	.173	.042	.166	4.097	.000
R			.850[a]			
R^2			.722			
Adj. R^2			.720			
Sig.F			.000a			
F-value			255.788			

a. Dependent Variable: BI

Note: PE: Performance Expectancy; EE: Effort Expectancy; SI: Social Influence; PP: Perceived Playfulness.

Source: Developed for the Research

4.3.2.1 Test of Significance

H_1: There is a relationship between performance expectancy and the intention to use M-learning

From Table 4.12, the path coefficient of performance expectancy is 0.331. It validates the positive association of performance expectancy with behavioural intention. As the p-value is below 0.01, performance expectancy is significantly different from behavioural intention. Hence, the null hypothesis is rejected and alternative hypothesis is accepted (β = 0.331, t = 7.275, p < 0.01).

H_2: There is a relationship between effort expectancy and the intention to use M-learning

From Table 4.12, the path coefficient of effort expectancy is 0.325. It validates the positive association of effort expectancy with behavioural intention. As the p-value is below 0.01, effort expectancy is significantly different from behavioural intention. Hence, the null hypothesis is rejected and alternative hypothesis is accepted (β = 0.325, t = 7.163, p < 0.01).

H_3: There is a relationship between social influence and the intention to use M-learning

From Table 4.12, the path coefficient of social influence is 0.105. It validates the positive association of social influence with behavioural intention. As the p-value is below 0.01, social influence is significantly different from behavioural intention. Hence, the null hypothesis is rejected and alternative hypothesis is accepted (β = 0.105, t = 2.690, p < 0.01).

H_4: There is a relationship between perceived playfulness and the intention to use M-learning

From Table 4.12, the path coefficient of perceived playfulness is 0.173. It validates the positive association of perceived playfulness with behavioural intention. As the p-value is below 0.01, perceived playfulness is significantly different from behavioural intention. Hence, the null hypothesis is rejected and alternative hypothesis is accepted ($\beta = 0.173$, $t = 4.097$, $p < 0.01$).

In conclusion, performance expectancy, effort expectancy, social influence and perceived playfulness are found to exert a significant positive influence towards behavioural intention to use M-learning among public university student in Klang Valley.

4.3.2.2 Nature of Relationship

Based on the output of Table 4.12, the following equation is being created.

$Y = 0.411 + 0.331\ X_1 + 0.325\ X_2 + 0.105\ X_3 + 0.173\ X_4$

Where;

Y = Dependent variable (Behavioural intention)

X_1 = Independent variable 1 (Performance Expectancy)

X_2 = Independent variable 2 (Effort Expectancy)

X_3 = Independent variable 3 (Social Influence)

X_4 = Independent variable 4 (Perceived Playfulness)

The equation indicates that when student expectation on the performance of M-learning is high, the acceptance level of M-learning will increase by 0.331 units, while other variables held constant. Conversely, if student perceived degree in associating with M-learning is high (effort expectancy), the acceptance level of M-learning will increase by 0.325 units, while other variables being constant. When a student perceive that it is important others

believe he or she should use M-learning (social influence), the acceptance level of M-learning will increase by 0.105 units, while other variables are constant. Besides that, if students perceived that M-learning will give them concentration, curiosity and, enjoyment (perceived playfulness), the acceptance level of M-learning will increase by 0.173 units, while other variables held constant.

4.3.2.3 Strength of Relationship

Based on Table 4.12, PE (B = 0.331) has the strongest impact on BI which is significant at 0.05 level and followed by EE (B = 0.325), SI (B = 0.105) and PP (B = 0.173).

The F-value of 255.788 is significant at the 0.05 level. This shows that the model is fit and the F-value is large.

From Table 4.12, R Square has a value of 0.722. It implies that the independent variables explain 72.2% of the variance in dependent variable. The remaining 27.8% of the variation in Behavioural Intention would be explained by other factors not taken into account in this study. According to Bonate (2005), an R Square that is more than 0.4 is considered acceptable.

4.4 Conclusion

Chapter 4 shows the demographic profile of the target respondents and the results from different data analysis. In next chapter would show the major findings, implications and limitations of this study. Recommendations for future research would also be provided in Chapter 5.

CHAPTER 5: DISCUSSION, CONCLUSION AND IMPLICATIONS

5.0 Introduction

In chapter 5, the results gathered in chapter 4 are being discussed. Summary of inferential analysis, major findings, implications, limitations and recommendations of the study are presented in this chapter as well. Lastly, an overall conclusion will be made.

5.1 Summary of Statistical Analysis

5.1.1 Summary of Descriptive Analysis

Table 5.1: Summary of Demographic Profiles

Profile	Category	Frequency	Percentage
Gender	Male	166	41.7
	Female	232	58.3
Age Group	Less than 20	34	8.5
	21-30	348	87.5
	31-40	14	3.5
	41-50	2	0.5
Marital Status	Single	371	93.2
	Married	27	6.8

Current Education Pursued	Diploma	34	8.5
	Degree	318	79.9
	Masters	37	9.3
	PhD	9	2.3
How Often Do You Have Your Mobile Devices With You?	Infrequently	3	0.8
	Sometimes	21	5.3
	Almost always	168	42.2
	Always	206	51.8
Where Do You Normally Use Your Mobile Devices?	Home	9	2.3
	School	185	46.5
	Home and school	136	34.2
	Home, School and In Transit	59	14.8
	Home, School, In Transit and At Work	9	2.3

Source: Developed for the Research

Table 5.1 represents the demographic profile of the target respondents. Females are more than males and most of them are single in the public university, which is statistically similar with the demographic statistics of Malaysia's Ministry of Higher Education. In general, most of the respondents are degree holders aged between 21 and 30. The target respondents always have their mobile device with them and normally use it at school; this possibility will lead to M-learning being successfully adopted in the education sector which consistent with study of Abas et al. (2009) that conduct survey of 2,837 students found that 99% of respondents had mobile phones, 83% felt it was possible to learn through mobile devices, and 64% felt ready to learn from M-learning within the next 12 months. This is also supported by Traxler (2007) who states that the M-learning through the use of mobile devices allows learners to access learning materials, so having a mobile device is an

important criteria to ensure the students can accept the implementation of M-learning. Moreover, students express excitement regarding the use of mobile devices for learning (Ramos, 2008).

5.1.2 Summary of Inferential Analysis

Table 5.2: Summary of Inferential Analysis

S	Hypotheses	Pearson Correlation	Multiple Linear Regression	
		Result	Result	Hypothesis
H_1	There is a relationship between performance expectancy and the intention to use M-learning.	0.776	0.331	Accepted
H_2	There is a relationship between effort expectancy and the intention to use M-learning	0.792	0.325	Accepted
H_3	There is a relationship between social influence and the intention to use M-learning	0.709	0.105	Accepted
H_4	There is a relationship between perceived playfulness and the intention to use M-learning	0.697	0.173	Accepted

Source: Developed for the Research

The result of Pearson's Correlation indicates that all independent variables (performance expectancy, effort expectancy, social influence, and perceived playfulness) are positively and moderately associated with the dependent variable (behavioural intention).

The result of Multiple Linear Regression implies that all independent variables (performance expectancy, effort expectancy, social influence, and perceived playfulness) are positively related with the dependent variable (behavioural intention). Therefore, all alternative hypotheses are accepted.

5.2 Discussions of Major Findings

5.2.1 Relationship between Performance Expectancy and Acceptance Level of M-learning

In this research, performance expectancy is found to be positively related to intention to use M-learning and the relationship is the strongest among the independent variables. This result is congruent with past studies by Jairak et al. (2009) and Wang et al. (2009). The reason that performance expectancy has the strongest effect is because acceptance level of m-learners will increase when they find that M-learning enables them to accomplish learning activities more quickly, effectively and flexibly (Wang et al., 2009). From the survey of this research on the public university students in Klang Valley, majority of respondents are willing to try on M-learning if they found that it is useful and can help them to improve their performance regardless of their education level and individual differences.

Besides that, the results show consistency with past studies (Al-Gahtani et al., 2007; Gunawardana & Ekanayaka, 2009; Im et al., 2011; Nassuora, 2012). This further enhances the importance of performance expectancy as a determinant to the ultimate decision of users of any particular technology innovation regardless of their professional qualifications or individual perspectives. The challenge of creating effective M-learning is to not only present it as a process that would bring tangible benefit, but also to ensure that the tangibility can be realised in order to ensure continued adoption from users (Gunawardana & Ekanayaka, 2009).

Moreover, Lu et al. (2005) found that relative advantage contributes significantly to intention to use. It is therefore believed that an individual with high performance expectancy is more likely to adopt M-learning than an individual with lower performance expectancy (Wang et al., 2009).

5.2.2 Relationship between Effort Expectancy and Acceptance Level of M-learning

In the context of this study, effort expectancy is positively related with behavioural intention to use M-learning which is consistent with the result obtained from Gunawardana and Ekanayaka (2009). This relationship could be showed the respondents lack experience in using M-learning (Gunawardana & Ekanayaka, 2009). This is support by Venkatesh et al. (2003) who states that when users have little experience with IT, the relationship between effort expectancy and behavioural intention to use is significant. However, users with more information technology and internet experience will find IT easy to use and therefore, their effort expectancy is not strongly related to their intention to use. Moreover, M-learning is still in its infancy stage and it is new technology in Malaysia (Ariffin, 2011; Yusof, Embi, Nordin, & Ooi, 2011) so respondents in this research are less experience on

using M-learning. This indicates that the result of effort expectancy in this research was consistent with past study.

The results are consistent with past studies (Jairak et al., 2009; Wang et al., 2009) which show there is positive relationship between effort expectancy and behavioural intention to use M-learning. This showed that the respondents tend to agree that M-learning is easy to use, easy to learn and understandable (Wang et al., 2009). Moreover, in this research the respondents are also agree that M-learning is easy to use, learn and understandable. This is indicated from the survey questionnaire of this research, as most of the respondents agree they can easily perform M-learning tasks and adopt M-learning. Apart from that, respondents also agree that their interaction with M-learning would be clear and understandable.

Furthermore, the positive relationship between effort expectancy and behavioural intention to use M-learning in this research is congruent with Lowenthal (2010), where respondents found that when using M-learning is convenient and they can become skillful. In this research the effort expectancy has same effect with past study (Lowenthal, 2010) is because the respondents from public university perceive that using M-learning they can become skilful and agree that use mobile devices in learning is convenient to them. This result is supported by the survey questionnaire from this research and the relationship showed there had high level acceptance of M-learning.

5.2.3 Relationship between Social Influence and Acceptance Level of M-learning

The findings show that there is a positive relationship between the social influence and the acceptance level towards M-learning. But among all the variables, social influence was the weakest variable.

This is not surprising as Jairak et al (2009) has also found that among performance expectancy, effort expectancy and social influence, social influence was also the weakest variable. The reason was due to students may not be influenced by others who think they should use M-learning. Alawadhi & Morris (2008) had also discovered that social influence was also the weakest variable as postgraduates believed that they have adequate experience of their chosen professions and are able to think sufficiently independently and normally place less weight on other's opinion.

In addition, Gunawardana & Ekanayaka (2009) found that social influence was the weakest variable among performance expectancy, perceived usefulness and effort expectancy.

In this research, the question that had the least percentage of agree and strongly agree was professors in my class have been helpful in the use of M-learning.This may be due to not all the public universities in Klang Valley have implemented M-learning into their education system, thus professors may not have encourage students to use M-learning.

Results obtained from the other questions which were related to family and friends were found to have a higher percentage towards agree and strongly agree. This shows that respondents do believe that people close to them or who are important to them would influence their acceptance level towards M-learning.

Nevertheless, social influence may the weakest variable among the all, but there is still a positive relationship towards the acceptance level of M-learning. Other past studies which were Wang et al (2007); Jairak et al (2009); Alawadhi & Morris (2008) have shown a consistent positive relationship between social influence and the accpetance level as people close to a person would still be able influence the person in accepting the use of a technology.

Alawadhi & Morris (2008) also suggest that peers influence the views of a person using online services if their experience were succesfull. Thus, if their peers had a positive experience the chances of increase the the influence rate will be high.

5.2.4 Relationship between Perceived Playfulness and Acceptance Level of M-learning

The results of this research have demonstrated the relationship of perceived playfulness towards the acceptance level of M-learning. It is found that perceived playfulness has significant positive relationship with the behavioural intention to use of M-learning. Hence, results in acceptance of Hypothesis 4.

This finding is in agreement with previous literature that has demonstrated the power of intrinsic motivators in the form of perceive playfulness in predicting user behavior, particularly in using Internet-based information systems (Huang et al., 2007; Lee et al., 2005; Liaw et al., 2007;; Lin, Wu & Tsai, 2005; Moon & Kim, 2001). Hence, this may imply that the ability of learning content to give an enjoyable experience is one of the factors that boost M-learning acceptance.

After comparing the independent variables in this research, it has also shown that perceive playfulness has stronger influence than social influence, one of the traditional UTAUT constructs, towards M-learning acceptance. This result is backed by past studies researched by Wang et al. (2009) and Gunawardana and Ekanayaka (2009). This may due to the factor that the usage of M-learning is more on voluntary basis rather than compulsory basis which makes M-learning's feature design more important in attracting user to use it as whether M-learning system is playful and enjoyable to be used (Wang et al., 2009).

As cited in Wang et al. (2009), the researcher has recommended that M-learning designers may refer to the framework of Chung and Tan (2004) on designing the playful element into M-learning systems. Basically, this is an exploratory study for the purpose of investigating perceived playfulness's antecedents and proposing a few antecedents for developing M-learning system as such as cognitive aspects, motivation for searching and website characteristics.

5.3 Implications of the Study

This research will serve as a base for future studies for Malaysia's education research on M-learning. Theoretically, it has extended and confirmed previous researches conducted in some of the Asian countries and further give a valuable contribution in UTAUT model for understanding the public university students' acceptance and intention towards M-learning specifically in Klang Valley, Malaysia.

This research further validates the modified version of UTAUT model in which the original variables and also addition variables like perceive playfulness are important elements in determining students' acceptance behavior and initiative towards M-learning for current literature.

The evidence of this study suggests that before institutions put M-learning into practical use, they need to ensure the features design are entertaining, easy to use and helpful throughout the students' learning process. Besides that, the high initiative of institutions or lecturers in using M-learning as their pedagogical tools is also one of the important determinants for whether students' intention to use is high.

Finally, with the increase popularity in mobility devices, based on the results of this study, it is possible to implement M-learning widely as student acceptance towards it is relatively high.

5.4 Limitations of the Study

There are a number of limitations that should be taken into consideration. The research focuses on selected variables which are performance expectancy, effort expectancy, social influence and perceived playfulness. However these few variables were only able to explain 72.2% of the behavioural intention, while the remaining 27.8% of the variation in behavioural intention would be due to other factors.

Secondly, the samples are focused on the public universities in Klang Valley. Thus, the findings might not be able to generalize the acceptance level of students to M-learning throughout all the higher education institutions in Malaysia.

Also, not all the public universities in the Klang Valley have implemented M-learning into their system. In this research some of the students were not exposed to the usage of M-learning, causing some of them to face difficulties when answering the survey questions as they do not have any hands-on experience. Thus, respondents are only able to answers the survey based on the definitions provided and their imagination of their satisfaction towards M-learning.

A cross-sectional study was used in this study, which indicates that the data is collected in a single point of time (Zikmund, 2003). The research method for this research is relevant. However, the information obtained in this research may only be applicable to the present situation in Malaysia and may not be applicable in the future as the data would then be outdated.

One source of weakness in this research which could have affected the measurements of was that the questionnaires are done in the English Language, which some respondents may not be able to understand as English is not their mother tongue. According to Nambiar (2007), learners at tertiary institutions in Malaysia have limited English vocabulary. With limited vocabulary to understand the survey questions, the respondents may simply select their answers which would affect the accuracy and reliability of the research.

Lastly, the main weakness of this research was the paucity of prior studies (Abas et al., 2009; Ariffin & Muthan, 2009; Devinder & Zaitun, 2006; Ismail et al., 2010) due to lack of research being done in Malaysia. Therefore, most of the journal articles that were obtained for this research were from foreign countries which some of the variables such as facilitating conditions may not be applicable in Malaysia.

5.5 Recommendations for Future Research

This research has revealed some limitations that need to be further investigated. Firstly, it is recommended that further research regarding M-learning in Malaysia could select and investigate other variables that would affect the behavioural intention of the user for example self-management of learning and perceived mobility value. Having to test other variables might help understand the acceptance level towards M-learning better.

Secondly, it is also recommended that further research be undertaken in the following areas such as having to obtain a larger sample size from different states in Malaysia for future findings which might be applicable to generalize the acceptance level toward M-learning throughout all the higher education institutions in Malaysia which are private and public universities.

In addition, a broader research is suggested for investigating the behavioural intention of the respondents. Future research can conduct a longitudinal study by providing workshops on M-learning to the respondents as it would also be interesting to compare the experience of individuals towards M-learning.

Lastly, respondents might have inadequate vocabulary knowledge in English. Moreover, English is not the official language in Malaysia. It is recommended that future survey questions could be bilingual – in English and Malay – as it would help the respondents to understand the questions with much ease. In addition, wordings in the survey question could be simpler. This would also help to increase the credibility of the research.

5.6 Conclusion

Mobile devices have penetrated into nearly every aspect of our lives, and the use of such devices as tools for learning, would undoubtedly become common practice in the future. In-depth studies in all aspects of M-learning are necessary and important because the M-learning is still in its infant stage (Kukulska-Hulme, 2007).

The results of this preliminary study can be used for supporting research or developing M-learning technology for students in the future. The objective of this research was to study the acceptance of M-learning by focusing on public university students in Klang Valley and also examined factors that had a positive relationship

with behavioural intention to use M-learning based on original UTAUT and additional independent variables (perceived playfulness).

The results of this research confirm four hypotheses. The results showed that a positive attitude leads to the behavioural intention to use M-learning. It is important for institutions to understand the determinants that influence students' perception before investing in and implementing M-learning. Thus, this research may contribute to increase the knowledge for the education sector to understand students' perceptions towards M-learning and to create awareness as many benefits of M-learning has not fully been realized in Malaysia.

The findings of this research will not only help M-learning practitioners develop better user-accepted M-learning systems and promote this new IT to potential users, but also provide insights into research on M-learning acceptance.

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APPENDIX A

Appendix A: Summary of Past Empirical Studies on Independent Variables and Dependent Variable

Study	Country	Data	Major Findings
1. Performance Expectancy (Al-Gahtani, Hubona, & Wang, 2007**)**	Saudi Arabia	Survey (722)	Performance expectancy has a positive influence on behavioural intentions
(Im, Hong, & Kang, 2011)	Korea & United States	Questionnaires (660)	Performance expectancy has a positive influence on technology adoption
(Wang, Wu, & Wang, 2009)	Taiwan	Questionnaires (330)	Performance expectancy has a positive effect on behavioural intention to use M-learning
(Gunawardana & Ekanayaka, 2009)	Sri Lanka	Questionnaires (210)	There is a relationship between performance expectancy and the intention to use M-learning
(Jairak, Praneetpolgrang, & Mekhabunchakij, 2009)	Thailand	Questionnaires (390)	Performance expectancy has a significant positive relationship with acceptance of M-learning
(Nassuora, 2012)	Saudi Arabia	Survey (80)	Performance expectancy has a significant positive relationship with acceptance of M-learning

Study	Country	Data	Major Findings
2. Efforty Expectancy (Liao, Yu, & Yi, 2011)	Taiwan	Questionnaires (932)	Effort expectancy has positive effect on intention to use e-learning
(Marchewka, Liu, & Kostiwa, 2007)	United States	Online Survey (132)	Effort expectancy has significant relationship on intention to use Blackboard
(Jairak, Praneetpolgrang, & Mekhabunchakij, 2009)	Thailand	Questionnaires (390)	Effort expectancy has a significant positive effect on behavioural intention to use M-learning
(Gunawardana & Ekanayaka, 2009)	India	Questionnaires (210)	There is a very significant relationship between effort expectancy and acceptance of M-learning
(Wang, Wu, & Wang, 2009)	Taiwan	Questionnaires (330)	Effort expectancy has a significant positive effect on behavioural intention to use M-learning
(Lowenthal, 2010)	United States	Questionnaires (113)	Effort expectancy has a significant effect on behavioural intention to use M-learning

Study	Country	Data	Major Findings
3. Social Influence (Wang, Wu, & Wang, 2009)	Taiwan	Survey (330)	Social influence has a significant effect on usage intention of M-learning
(Gunawardana & Ekanayaka, 2009)	Sri Lanka	Questionnaires (210)	Social influence is found to have a moderate impact on intention to use
(Jairak, Praneetpolgrang, & Mekhabunchakij, 2009)	Thailand	Questionnaires (390)	Positive relationship between social influence with acceptance level
(Venkatesh & Davis, 2000)	USA	Questionnaires (156)	Social influence has a significant influence the intention to use M-learning.
(Cheng, Yu, Huang, Yu, & Yu, 2011)	Taiwan	Questionnaires (264)	There is a significant impact between social influence and behavioural intention to use M-learning
(Alawadhi & Morris, 2008)	United States	Survey (880)	Social influence has a significant influence on peers.

Study	Country	Data	Major Findings
4. Perceived Playfulness (Huang, Lin, & Chuang, 2007)	Taiwan	Online Survey (313)	Perceived playfulness is positively related to behavioural intention to use of M-learning
(Wang, Wu, & Wang, 2009)	Taiwan	Survey (330)	Perceived playfulness is positively related to behavioural intention to use of M-learning
(Venkatesh & Brown, 2001)	U.S.A	Mail and Telephone Survey (700)	Perceived playfulness is positively related to behavioural intention to use of M-learning
(Phuangthong & Malisawan, 2005)	Thailand	Survey (385)	Perceived playfulness is included to explain users' behavior
(Chiu & Wang, 2008)	Taiwan	Email Survey (286)	Perceived playfulness is significant predictor of individuals' intentions to continue the use of web-based learning.

APPENDIX B

Appendix B: Definition for Each Variable

Constructs	Definition	Sources
Performance Expectancy	The degree to which individuals believe that use of a system will help them improve their performance.	(Venkatesh et al., 2003)
Effort Expectancy	the degree of ease with which potential users can grasp the use of a system	(Venkatesh et al., 2003).
Social Influence	The extent to which a person perceives that important others – such as family members and close friends – believe he or she should use a new information system.	(Venkatesh et al., 2003)
Perceived Playfulness	Defines as "a state of mind that contains three aspects: the degree to which the individual (1) perceives that his or her interest is focused on the interaction with M-learning (i.e., concentration); (2) is curious all through the interaction (i.e., curiosity); and (3) finds the interaction intrinsically enjoyable or interesting (i.e., enjoyment)"	(Wang et al., 2009, p. 99)

APPENDIX C

Appendix C: Sources of Variables

a) Independent Variables

Variable	Item	Description	References	Measurement
Performance Expectancy	PE 1	I would find mobile learning useful in my learning.	(Jairak, Praneetpolgrang, & Mekhabunchakij, 2009 ; Al-Gahtani, Hubona, & Wang, 2007)	Likert scale
	PE 2	Using mobile learning enables me to accomplish learning activities more quickly.	(Jairak, Praneetpolgrang, & Mekhabunchakij, 2009 ; Al-Gahtani, Hubona, & Wang, 2007)	Likert scale
	PE 3	Using mobile learning increases my learning productivity.	(Jairak, Praneetpolgrang, & Mekhabunchakij, 2009 ; Al-Gahtani, Hubona, & Wang, 2007)	Likert scale
	PE 4	If I use mobile learning, I will increase my chances of achieving better grades.	(Jairak, Praneetpolgrang, & Mekhabunchakij, 2009 ; Al-Gahtani, Hubona, & Wang, 2007)	Likert scale
	PE 5	Mobile learning is very useful for education overall.	(Al-Gahtani, Hubona, & Wang, 2007)	Likert scale
	PE 6	Using the mobile learning fits my style of learning and studying	(Keller, Hrastinski, & Carlsson, 2007)	Likert scale

Variable	Item	Description	References	Measurement
Effort Expectancy	EE 1	My interaction with mobile learning would be clear and understandable.	(Marchewka, Liu, & Kostiwa, 2007; Jairak, Praneetpolgrang, & Mekhabunchakij, 2009)	Likert scale
	EE 2	It would be easy for me to become skilful at using mobile learning.	(Im , Hong, & Kang, 2011; Marchewka, Liu, & Kostiwa, 2007; Jairak, Praneetpolgrang, & Mekhabunchakij, 2009)	Likert scale
	EE 3	I would find mobile learning easy to adopt.	(Im , Hong, & Kang, 2011 ; Marchewka, Liu, & Kostiwa, 2007; Jairak, Praneetpolgrang, & Mekhabunchakij, 2009)	Likert scale
	EE 4	I consider learning to operate mobile learning as a simple process.	(Im , Hong, & Kang, 2011; Marchewka, Liu, & Kostiwa, 2007; Jairak, Praneetpolgrang, & Mekhabunchakij, 2009)	Likert scale
	EE 5	Using mobile devices in learning is convenient.	(Carlsson, Carlsson, Hyvönen, Puhakainen, & Walden, 2006)	Likert scale
	EE 6	To use the mobile learning does not require a lot of mental effort	(Keller, Hrastinski, & Carlsson, 2007)	Likert scale

Variable	Item	Description	References	Measurement
Social Influence	SI 1	People who influence my behaviour think that I should use mobile learning.	(Venkatesh, Morris, Davis, & Davis, 2003)	Likert scale
	SI 2	Family members important to me would think that using mobile learning would be a good idea.	(Lu & Viehland, 2008)	Likert scale
	SI 3	My friends important to me would think that using mobile learning would be a good idea.	(Lu & Viehland, 2008)	Likert scale
	SI 4	Professors in my classes have been helpful in the use of mobile learning.	(Jairak, Praneetpolgrang, & Mekhabunchakij, 2009)	Likert scale
	SI 5	The administration of this university has been supportive in the use of mobile learning.	(Marchewka, Liu, & Kostiwa, 2007)	Likert scale
	SI 6	In general, the university has supported the use of mobile learning.	(Marchewka, Liu, & Kostiwa, 2007)	Likert scale

Variable	Item	Description	References	Measurement
Perceived Playfulness	PP 1	When using mobile learning, I will not realize that the time has elapsed.	(Wang, Wu, & Wang, 2009; Moon & Kim, 2001)	Likert scale
	PP 2	When using mobile learning, I will forget the work I must do.	(Wang, Wu, & Wang, 2009; Moon & Kim, 2001)	Likert scale
	PP 3	Using mobile learning will give enjoyment to me in my learning.	(Wang, Wu, & Wang, 2009; Moon & Kim, 2001)	Likert scale
	PP 4	Using mobile learning will stimulate my curiosity.	(Wang, Wu, & Wang, 2009; Moon & Kim, 2001)	Likert scale
	PP 5	Using mobile learning will lead to my exploration.	(Wang, Wu, & Wang, 2009; Moon & Kim, 2001)	Likert scale
	PP 6	Overall, I have a positive experience when using mobile learning.	(Wang, Wu, & Wang, 2009)	Likert scale

b) Dependent Variable

Variable	Item	Description	References	Measurement
Behavioural intention	BI 1	I intend to use mobile learning in the future.	(Wang, Wu, & Wang, 2009 ; Bhattacherjee, 2001)	Likert scale
	BI 2	I predict I would use mobile learning in the future.	(Wang, Wu, & Wang, 2009 ; Bhattacherjee, 2001)	Likert scale
	BI 3	I plan to use mobile learning in my studies in future.	(Wang, Wu, & Wang, 2009 ; Bhattacherjee, 2001)	Likert scale
	BI 4	I intend to learn more information about mobile learning.	(Venkatesh, Morris, Davis, & Davis, 2003; Jayasing & Eze, 2009)	Likert scale
	BI 5	I intend to use mobile learning when the service becomes widely available.	(Kurnia, Smith, & Lee, 2007)	Likert scale

APPENDIX D

Appendix D: Questionnaire

UNIVERSITI TUNKU ABDUL RAHMAN

Faculty of Business and Finance

BACHELOR OF COMMERCE (Hons) ACCOUNTING

FINAL YEAR PROJECT

Determinants Affecting Acceptance Level of Mobile Learning Among Public University Students

Survey Questionnaire

Dear respondent,

We are final year undergraduate students of Bachelor of Commerce (Hons) Accounting, from Universiti Tunku Abdul Rahman (UTAR). The **purpose** of this survey is to examine **Determinants Affecting Acceptance Level of Mobile Learning Among Public University Students**.

Thank you.

Instructions:

1) There are **THREE** (3) sections in this questionnaire. Please answer ALL questions in ALL sections.

2) Completion of this form will take you less than 5 minutes.

3) The contents of this questionnaire will be kept **strictly confidential**.

Section A: Demographic Profile

Please place a tick "√" or fill in the blank for each of the following:

1. Gender:

- □ Male
- □ Female

2. Age:

- □ Less than 20
- □ 21-30
- □ 31-40
- □ 41-50
- □ 51 and above

3. Marital status:

- □ Single
- □ Married
- □ Other _____

4. Current education pursued:

- □ Diploma
- □ Degree
- □ Masters
- □ PhD
- □ Other _____

5. How often do you have your mobile device (Eg: Ipad, Mobile phone or PDA) with you?

- □ Almost never
- □ Infrequently
- □ Sometimes
- □ Almost always
- □ Always

6. Where do you normally use your mobile device? (can choose more than one)

- □ Home
- □ School
- □ In transit
- □ At work
- □ Other _____

Section B:

This section is seeking your opinion regarding the importance of different types of determinants. Respondents are asked to indicate the extent to which they agreed or disagreed with each statement using 5-point Likert scale [(1) = strongly disagree; (2) = disagree; (3) = neutral; (4) = agree and (5) = strongly agree] response framework. Please choose one number per line to indicate the extent to which you agree or disagree with the following statements.

Definition of Mobile Learning

Mobile learning can be defined as 'any educational provision where the sole or dominant technology devices are handheld or palmtop devices'. This definition may mean that mobile learning could include mobile phones, smartphones, personal digital assistants (PDAs) and their peripherals, perhaps tablet PCs and perhaps laptop PCs, but not desktops and other similar solutions (Traxler, 2005).

B1 Performance expectancy

Definition: Degree to which an individual believes that using the system will help him or her to attain gains in job performance.

No.	Questions	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
PE1	I would find mobile learning useful in my learning.	1	2	3	4	5
PE2	Using mobile learning enables me to accomplish learning activities more quickly.	1	2	3	4	5
PE3	Using mobile learning increases my learning productivity.	1	2	3	4	5
PE4	If I use mobile learning, I will increase my chances of achieving better grades.	1	2	3	4	5
PE5	Using the mobile learning fits my style of learning and studying.	1	2	3	4	5
PE 6	Mobile learning is very useful for education overall.	1	2	3	4	5

B2 Effort Expectancy

Definition: Degree of ease associated with the use of the information system.

No.	Questions	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
EE1	My interaction with mobile learning would be clear and understandable.	1	2	3	4	5
EE2	It would be easy for me to become skillful at using mobile learning.	1	2	3	4	5
EE3	I would find mobile learning easy to adopt.	1	2	3	4	5
EE4	I consider learning to operate mobile learning as a simple process.	1	2	3	4	5
EE5	Using mobile devices in learning is convenient.	1	2	3	4	5
EE 6	It is easy to remember how to perform tasks in the mobile learning.	1	2	3	4	5

B3 Social Influence

Definition: The extent to which a person perceives that important others believe he or she should use a new information system.

No.	Questions	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
SI1	People who influence my behaviour think that I should use mobile learning.	1	2	3	4	5
SI2	Family members important to me would think that using mobile learning would be a good idea.	1	2	3	4	5
SI3	My friends whom are important to me would think that using mobile learning would be a good idea.	1	2	3	4	5
SI4	Professors in my classes have been helpful in the use of mobile learning.	1	2	3	4	5
SI5	The administration of this university has been supportive in the use of mobile learning.	1	2	3	4	5
SI6	In general, the university has supported the use of mobile learning.	1	2	3	4	5

B4 Perceived Playfulness

Definition: Status of mind that will give concentration, curiosity and, enjoyment when interacting with M-learning.

No.	Questions	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
PP1	When using mobile learning, I will not realize that the time has elapsed.	1	2	3	4	5
PP2	When using mobile learning, I will forget the work I must do.	1	2	3	4	5
PP3	Using mobile learning will give enjoyment to me in my learning.	1	2	3	4	5
PP4	Using mobile learning will stimulate my curiosity.	1	2	3	4	5
PP5	Using mobile learning will lead to my exploration.	1	2	3	4	5
PP6	Overall, I have a positive experience when using mobile learning.	1	2	3	4	5

Section C

This section is seeking your opinion regarding the intention to use M-learning with different types of determinants. Respondents are asked to indicate the extent to which they agreed or disagreed with each statement using 5-point Likert scale [(1) = strongly disagree; (2) = disagree; (3) = neutral; (4) = agree and (5) = strongly agree] response framework. Please choose one number per line to indicate the extent to which you agree or disagree with the following statements.

C1 Behavioural intention

Definition: The individual decision regarding future system use.

No.	Questions	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
BI1	I intend to use mobile learning in the future.	1	2	3	4	5
BI2	I predict I would use mobile learning in the future.	1	2	3	4	5
BI3	I plan to use mobile learning in my studies in future.	1	2	3	4	5
BI4	I intend to learn more information about mobile learning.	1	2	3	4	5
BI5	I intend to use mobile learning when the service becomes widely available.	1	2	3	4	5

Thank you for your participation.

~ The End ~

APPENDIX E

Appendix E: Online Questionnaire

Determinants Affecting Acceptance Level of Mobile Learning Among Public University Students

Dear respondent,

We are final year undergraduate students of Bachelor of Commerce (Hons) Accounting, from Universiti Tunku Abdul Rahman (UTAR). The purpose of this survey is to examine Determinants Affecting Acceptance Level of Mobile Learning Among Public University Students.

Thank you.

* Required

Intructions

1) There are THREE (3) sections in this questionnaire. Please answer ALL questions in ALL sections.

2) Completion of this form will take you less than 5 minutes.

3) The contents of this questionnaire will be kept strictly confidential.

Section A: Demographic Profile

Please choose the answer for each of the following:

1. Gender *

- ○ Male
- ○ Female

2. Age *

- ○ Less than 20
- ○ 21-30
- ○ 31-40
- ○ 41-50
- ○ 51 and above

3. Marital status *

- ○ Single
- ○ Married
- ○ Other: [ ]

4. Current education pursued *

- ○ Diploma
- ○ Degree
- ○ Masters
- ○ PhD
- ○ Other: [ ]

5. How often do you have your mobile device (Eg: Ipad, Mobile phone or PDA) with you? *

- ○ Almost never
- ○ Infrequently
- ○ Sometimes
- ○ Almost always
- ○ Always

6. Where do you normally use your mobile device? (Can choose more than one) *

- ▢ Home
- ▢ School
- ▢ In Transit
- ▢ At work
- ▢ Other:

Section B

This section is seeking your opinion regarding the importance of different types of determinants. Respondents are asked to indicate the extent to which they agreed or disagreed with each statement using 5-point Likert scale [(1) = strongly disagree; (2) = disagree; (3) = neutral; (4) = agree and (5) = strongly agree] response framework. Please choose one number per line to indicate the extent to which you agree or disagree with the following statements.

Definition of Mobile Learning

Mobile learning can be defined as "any educational provision where the sole or dominant technology devices are handheld or palmtop devices".

This definition may mean that mobile learning could include mobile phones, smartphones, personal digital assistants (PDAs) and their peripherals, perhaps tablet PCs and perhaps laptop PCs, but not desktops and other similar solutions (Traxler, 2005).

B1. Performance Expectancy (PE) *

Definition: Degree to which an individual believes that using the system will help him or her to attain gains in job performance.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I would find mobile learning useful in my learning.	○	○	○	○	○
Using mobile learning enables me to accomplish learning activities more quickly.	○	○	○	○	○
Using mobile learning increases my learning productivity.	○	○	○	○	○
If I use mobile learning, I will increase my chances of achieving better grades.	○	○	○	○	○
Using the mobile learning fits my style of learning and studying.	○	○	○	○	○
Mobile learning is very useful for education overall.	○	○	○	○	○

B2. Effort Expectancy *

Definition: Degree of ease associated with the use of the information system.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
My interaction with mobile learning would be clear and understandable.	○	○	○	○	○
It would be easy for me to become skillful at using	○	○	○	○	○

APPENDIX F

Appendix F: Sample Size Calculator and Sample Size Formula