UNIVERSITY OF SOUTHAMPTON

FACULTY OF SOCIAL, HUMAN AND MATHMATICAL SCIENCES

Southampton Education School

Factors Influencing Female Undergraduate Students' Acceptance Of, And Motivation To, Use Tablet Computers For Learning

by

Azza Mohammed Alomary

Thesis for the degree of Doctor of Philosophy

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UNIVERSITY OF SOUTHAMPTON

ABSTRACT

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FACTORS INFLUENCING FEMALE UNDERGRADUATE STUDENTS' ACCEPTANCE OF, AND MOTIVATION TO, USE TABLET COMPUTERS FOR LEARNING

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M-learning can play an important role in the development of teaching and learning methods for higher education. Nevertheless, the successful implementation of m-learning in higher education will be dependent on users' acceptance of this technology. Therefore, the purpose of this study is to give a better understanding of female undergraduate students' attitudes towards using tablet computers in learning through exploring factors that influence students' motivation to use and their acceptance of tablet use in learning. This study explores female students' preferred ways of learning when using tablets, as well as the barriers to tablet use, in the context of higher education in the Kingdom of Saudi Arabia. The research develops a new model which integrates the original technology acceptance model (TAM) with self-determination theory (SDT), and names it *Motivation and Acceptance of Learning with Tablet* (MALT). The new model is developed initially from the literature and then verified through students' perspectives gained from twenty semi-structured interviews in the first phase. The complete model is validated further based on students' perspectives gathered via 303 online questionnaires in the second phase, and then finally validated by using responses of experts gathered via three semi-structured interviews in the third phase. The study follows an exploratory sequential mixed methods design which gathers qualitative and quantitative data in an ordered sequence. Thematic analysis is used to analyse the interviews and exploratory and confirmatory factor analysis as well as structural equation modelling to analyse the questionnaire. The study outcomes are a new research model (MALT) and a validated metric. The research used a systematic mixed methods triangulation approach to identifying the factors of students' motivation to use and their acceptance of tablet use for learning, which may be useful for future researchers in the area of acceptance of mobile technology enhanced learning. Also, there are statistics results and recommendations that can be brought to the attention of policy makers regarding tablet use in higher education. The research contributes to the body of knowledge in the educational technology field instrumentally, theoretically, methodologically and practically.

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DECLARATION OF AUTHORSHIP

I, Azza Alomary

declare that this thesis and the work presented in it are my own and has been generated by me as the result of my own original research.

Factors Influencing Students' Acceptance Of And Motivation To Use Tablet Computers For Learning In Higher Education

I confirm that:

1. This work was done wholly or mainly while in candidature for a research degree at this University;
2. Where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated;
3. Where I have consulted the published work of others, this is always clearly attributed;
4. Where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work;
5. I have acknowledged all main sources of help;
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Abbreviations

M-learning: mobile learning.

HE: higher education

ICT: information and communication technology

TAM: technology acceptance models

SDT: self-determination theory

MALT: motivation and acceptance of learning with tablet

SEM: structural equation modelling

FA: factor analysis

Chapter 1: Introduction

1.1 Background

Over the past decade, education systems in general and higher education (HE) in particular have seen transformations because of the development of information and communication technology (ICT). The conventional 'chalk and talk' method of lecturing in public and private universities in Kingdom of Saudi Arabia has gradually been supplemented by technology-enhanced teaching/learning processes (Al-Qirim, 2011; Al-Wabil, 2015; Almarwani, 2011; Gursul & Tozmaz, 2010; Martin et al., 2011). This have taken the form of multimedia and web-based systems such as smart boards, smart class rooms, virtual learning environments and online assessment. These have been evaluated on different courses across programmes of study with encouraging results (Boakye, 2016; Eristi et al., 2011; Naismith & Corlett, 2006; Sevindik, 2010; Williams & Pence, 2011). In the Kingdom of Saudi Arabia, many universities have provided technology facilities both software and hardware, to enhance teaching and learning processes.

A HEPI report cited evidence from 15 years of project work in the United States, which suggested that using technology-enhanced learning can enable institutions to improve learning outcomes and reduce costs (Davies et al., 2017). Many studies have investigated technology-enhanced learning (TEL) both qualitatively and quantitatively. Some concluded that TEL has a positive influence on learning (Economides & Grousopoulou, 2009; Huang et al., 2008; Jeong & Hong, 2011) while others highlighted its inadequacies (Eristi et al., 2011; Huang et al., 2008; Jun & Zhi-yi, 2010). One of the forms of technology-enhanced learning is mobile learning (m-learning). Williams and Pence (2011), in their study of the role of technology in chemistry teaching, found that smart phones can enhance learning, and Moran et al. (2010) concluded that using tablet computers in higher education was very effective. However, on the whole, it is evident that a clear picture of m-learning affordance and effectiveness has yet to be obtained, and this will be commented on in the literature review. M-learning might play an essential role in the development of teaching and learning processes in higher education (Ali, 2012). However, the successful implementation of m-learning in higher education is reliant on users' acceptance of this kind of technology.

Amongst mobile devices and other technologies, researchers agree that tablet computers are useful tools for educational purposes and that it can be used very effectively to enhance student learning and interaction, and to increase student motivation and engagement (Fischer et al., 2013; Kothaneth et al., 2012; Mohseni, 2014). The tablet computer has recently become a very popular tool in education. The Apple iPad, launched in 2010, was the initial market leader in tablet

technology, and since then other manufacturers including Samsung, Motorola, Lenovo, Toshiba, Acer and Asus have been quick to launch their own tablets with Google's mobile operating system, Android. Motion's Blackberry Playbook and HP's TouchPad are also in the category of "tablet". The touch screen technology of these devices has significant implications for learning, since it is highly interactive. Against the fixed type of ICT tools, the mobile technologies are better able to enhance and support learning, a fact which has proved attractive to the current generation of students because they are easier and faster. The reasons for using technological devices, and particularly mobile devices, are to enhance, support and transform the learning experience in order to improve learning outcomes for students (Context, 2014). So, the versatility and flexibility of tablets may provide the potential to change the learning experience of students. However, the deployment, monitoring and management of tablets are issues which need to be tackled. In addition, there is still a significant gap in the literature on tablets acceptance in the higher education particularly in the Kingdom of Saudi Arabia. The following section describes the context.

1.2 Context Background

1.2.1 The History of Education in the Kingdom of Saudi Arabia (KSA)

The Ministry of Education became a separate, independent body in 1954, and this change led to a radical shift in educational policy and the appearance of a formal KSA education system. The education system was dependent on principles such as correct values and behaviour, with Islam being the background to all academic subjects. In addition, the system upheld female rights to education (Alhamed et al., 2007).

King Abdul Aziz realised from the beginning of the Kingdom's existence that military power alone was not enough to consolidate the foundations of national unity. In 1923, he designed a far-reaching plan for the implementation of social and economic reforms, including an educational programme called the *netham alkhajr*, whose aim was to transform the *badia* society into a stable and peaceful one (Alhamed et al., 2007).

After entering Mecca in 1924, King Abdul Aziz invited its scientists to the first educational meeting in the history of the new Kingdom and urged them to make the effort to spread education; this early interest eventually led to the establishment of the Ministry of Education in 1926 (Alhamed et al., 2007). In 1928, a royal decree to standardise education in the Hejaz made it compulsory but also free. Education at that time consisted of four stages: foundation, primary, secondary and higher. When Saudi Arabia united in 1932 and became the Kingdom of Saudi Arabia, education improved and became more widespread. In 1943, the education system was revised, with the

foundation and primary stages merging and taking six years to complete, followed by three years each of intermediate and secondary education. This system is still in place today. The education system in KSA is single sex; that is, male and female education is separate (Alhamed et al., 2007; Ministry of Education, 2014).

1.2.2 Higher Education in KSA

Higher education (HE) in Kingdom of Saudi Arabia (KSA) refers to the levels above high school or secondary school; students who register in HE are 18 years or older.

HE in KSA has changed over time. From 1953 the controlling body for higher education in KSA was the Ministry of Higher Education (Alhamed et al., 2007) but a decision by King Salman in 2014 has now made the Ministry of Education responsible for all levels (Ministry of Education, 2014). The main objective of the Ministry is to encourage male and female students from all sectors of the population to enrol in higher education (Ministry of Education, 2014). As an incentive, the government gave free-living accommodation to students in higher education and provided an additional grant of $250 per month. These measures resulted in a rise in student enrolments (Ageel, 2013) and in 2014 the student population had grown to over 1,300,000, with over 64,000 faculty staff (Al-Wabil, 2015). Statistics for enrolment in public higher education institutions in 2014 showed more women than men enrolled in full-time programmes of study (Ministry of Education, 2014). As of 2014 in KSA there are 26 public universities, 10 private universities and 39 private colleges (Ministry of Education, 2014). The first university was Umm-Al-Qura University, which was built in 1949 (Al-Wabil, 2015). Private colleges have a significant impact on improving higher education facilities within the country and they receive extensive support from the Ministry of Education (Ageel, 2013; Al-Wabil, 2015; Ministry of Education, 2014).

Some sources indicated that the basis of higher education in the Kingdom was the introduction of specialised scientific lessons in 1927, which King Abdul Aziz required scientists to provide in the two Holy Mosques (Alhamed et al., 2007). In its early period, KSA focused on providing overseas scholarships for students so that they could acquire the competencies needed in various disciplines (Alhamed et al., 2007). Some students were sent to Egypt, while others studied in Europe and the US. Higher education as such began with the establishment of the first religious college in Mecca in 1950, followed by a college for teachers there in 1953 (Alhamed et al., 2007).

The Minister of Education at this time, King Fahad, founded the first university in Riyadh in 1958 and named it the King Saud University. Since then the number of Saudi universities and colleges began to expand and the Ministry of Higher Education was established in 1976 to deal with policy and administration (Alhamed et al., 2007). Today there is an unprecedented number of

undergraduates studying in Saudi universities, and this continues to grow (Alhamed et al., 2007; Almarwani, 2011). In 2007, almost 85% of students in higher education were specialists in social science studies, which has led to a surplus of Islamic, humanitarian, and social studies graduates (Alhamed et al., 2007). Nowadays, there are a lot of students who study natural science subjects such as health science, engineering, computer science and also entrepreneurship.

To sum up, more Saudi students are enrolled in universities nowadays and it is noted that Saudi female are registered in universities more than male.

1.2.3 Educational Technology in Higher Education in KSA

Some researches asserted that the higher education system in KSA is not keeping pace with changing times and educational demands (Ageel, 2013; Alhamed et al., 2007; Almarwani, 2011). However, technology in higher education in KSA has still increased and is thought to have changed for the better (Al-Wabil, 2015). The higher education curriculum in KSA is constantly upgraded to meet the challenges of social and economic developments in the country as well as changes in international technology. Educational technology is being promoted in the country and colleges are well-equipped with educational technology tools such as audio-visual systems, multimedia and the Internet. Some of the more recent electronic teaching aids such as learning management systems are available in some universities. An interesting result from a case study by Al-Wabil (2015) is that public universities in KSA have taken the lead in providing mobile applications rather than private universities. They are providing a range of applications within the education and learning environment, as well as innovative technology in distance learning and the virtual learning environment (Ageel, 2013). This includes enabling video conferencing facilities in higher educational institutions, accessing the internet via Wi-Fi, and installing specific applications (Ageel, 2013).

In 2011, the government assigned a budget of 154.7 billion dollars to education, indicating that education is now treated as one of the most important fields and is a major concern of the Saudi government. Education in KSA universities has moved slowly from traditional learning to distance and then electronic learning (Al-Hujran et al., 2014); this is expected to shift soon towards mobile learning.

The Human Development Report of 2001 predicted that three trillion dollars would be spent worldwide in 2003 on the field of information technology (Alhamed et al., 2007). This new attention to the demands of the educational system encouraged many countries, led by the US, the UK and Japan, to reform their educational systems from the early 80s onwards, and this trend shows no signs of stopping. Neither is the Kingdom of Saudi Arabia far from these developments, and

educational technology has been introduced into Saudi schools and universities either as a means of study or as a discipline to master (Al-Hujran et al., 2014; Alhamed et al., 2007).

However, educational technology in KSA still needs a lot of effort in order to keep pace with advancements in the developed world. The weakness of ICT in the Saudi educational system may be due to:

- the traditional focus on students passively learning theoretical concepts;
- a lack of the sense of usefulness of educational technology;
- concentration on teacher delivery of education rather than employing educational technology;
- lack of concern for the real needs of the modern learner and the demands of his growth and development in the 21st century;
- inadequate training for teachers in the use of educational technology;
- lack of awareness among planners of educational policies;
- poor use of technology-appropriate education for each grade level;
- rigidity of current administration practices in educational institutions;
- lack of financial resources and provision that allow the educational system access to modern digital technology.

(Alhamed et al., 2007).

However, the e-learning and distance education projects in KSA higher education institutions are considered to be leading projects. The Ministry of Higher Education launched a national project named AAFAQ, the purpose of which is to develop a comprehensive long-term plan for higher education as well as to address current and the future challenges (Almarwani, 2011). Despite the presence of a number of related educational technology projects in most of the KSA universities and colleges, the need was urgent to establish a comprehensive project to combine all the efforts, build upon successes, reduce waste, develop expertise which can transcend the difficulties and plan to avoid obstacles. AAFAQ project began in 2005, with the strategic vision of establishing an integrated educational system that depends on educational technology and distance education in the form of a national centre that supports the educational process in higher education institutions at all stages and for all categories without restrictions of time or place. It represents a way to realise the vision of KSA in its goal to make science and knowledge widespread and available to all (Alhamed et al., 2007).

1.2.4 Mobile Learning in KSA

KSA is a very large country with a widespread and growing population. Besides the urban universities, many rural universities also offer higher education. To overcome communication

problems between rural and urban universities, lecturers and administrators, lecturers and students, and between students themselves in different universities, mobile learning (m-learning) may be the best solution, since e-learning, with all its possibilities for overcoming the space and time problem, would be very expensive and time-consuming (Al-Hujran et al., 2014; Almarwani, 2011). Mobile devices can be used in the blended-learning environment (Almarwani, 2011). Moreover, m-learning in KSA would be easy to establish (Al-fahad, 2009). The general willingness of today's digital age students to use m-learning is an additional and important factor in its favour (Almarwani, 2011). On the other hand, m-learning as a feature of educational technology is still in its infancy and requires careful investigation if it is to be successfully implemented in higher education institutions in KSA (Al-Hujran et al., 2014).

1.2.5 King Abdulaziz University (KAU)

King Abdulaziz University was established in 1967 in an urban area in Jeddah as the first private university and became a public institution in 1972. Its first intake comprised 68 male and 30 female students, while today it educates thousands of students across twenty different faculties (Alhamed et al., 2007; "King Abulaziz University," 2016). It is honoured to have the name of the founder of the Kingdom, King Abdulaziz Ibn Soud (King Abulaziz University, 2016). The university holds first place out of the top 15 Arab universities in 2016 (Bothwell, 2016). It has more than 4,500 staff members, who hold PhD degrees from reputable American and European Universities, and a total of more than 25,000 students from 60 nationalities, (10650 female and 14500 male) ("King Abulaziz University," 2016). It has 16 centres of research excellence, 24 scientific research chairs and an endowment to support its research; the annual research funding is around $70 million ("King Abulaziz University," 2016). The quality of the academic and distance learning programmes is shown by the 76 international accreditations from reputed American and European associations ("King Abulaziz University," 2016).

The followings are some characteristics of KAU:

- There are only two academic disciplines at KAU; one is natural science and the other is social science. Natural science includes faculties such as health, physics, mathematics, engineering whereas social science includes faculties such as Islamic studies, languages, psychology, history, art.
- Female section is separate from the male section. It is a gated environment for females. All students, teachers, administrators, saleswoman, cleaners and securities are females.
- It is not allowed for any male to enter the female campus. There is a male security outside the female campus to make sure that no male enter, and female securities inside the female

campus. People who enter the female campus are female students or staff or cleaners. If any female wants to enter the female campus but does not belong to KAU, she needs to sign a form and get permission.

- Females can take off their hijab inside their campus.
- Females can travel between the buildings either on foot or riding golf cars which are driven by females.
- When a male teaches females, they use video conferencing inside the classrooms and when female students want to contact the male teacher, they use special microphones, which the university provided, inside the classrooms.
- Although most of KAU students live in Jeddah, KAU provides a private accommodation for female students who do not live in Jeddah.
- At KAU, a lot of teachers use the technology devices which the university provides them in their teaching. The dominant current pedagogy is based on lectures with the use of PowerPoint inside the classroom and the use of learning management system (e.g. Blackboard) outside the classroom. There are no seminars or tutorials.
- King Abdulaziz University provides a lot of ICT facilities for staff and students. For example, it has its own mobile applications and online systems such as “My KAU” which can be used by staff and students to access modules, schedules and discussions. There are also “KAU Stu Guide” and “KAU map” which can be used as a guide for new students and staff. “Ashal” introduces all the available electronic services, “Tebyan” teaches the Qura’an, “Fursa” is an internship programme for students, “Qayyem Rasheh” enables staff to apply for jobs within the university, “Fekra” is used by staff and students to submit suggestions and “Akhlaqeyyat Almehna” gives information to staff about ethics (King AbdulAziz University, 2016).
- Although KAU has provided a lot of technology facilities and has its own mobile applications, it has not provided a good mobile learning environment for its students to enhance their learning. For example, there are still problem with the Internet access inside the university and female students are not allowed to enter the campus with their own mobile technology devices (e.g. wireless laptops and tablets) unless they have permission.

1.3 Rationale for The Study

The need for comprehensive research into tablet computing in education first became clear to me while undertaking university teaching. One of the reasons is the current excessive and wasteful use of paper resources and another is the need for students to buy books, which, as well as being expensive, are also heavy to carry around on a daily basis (Mang & Wardley, 2012). This can be considered inconvenient as well as physically damaging. It is claimed that many students cannot

afford to buy the large number of set textbooks that their courses require. Since textbooks are also often heavy to carry around to seminars and tutorials, the introduction of tablets would make it cheaper and easier for students to have access to many books, without the expense and inconvenience of buying and carrying hard copies (Ali, 2012). Therefore, using tablet computers might provide a simple solution to these problems. Using tablet computers for learning would not only mean that students could have access to up-to-date information, but it may well prove to be a less expensive option than buying textbooks and stationery (Alqhtani et al., 2013).

It is claimed that student preferences have changed along with cultural and technological advances and they may no longer be the same students that the educational system was designed to teach. This may create a cultural gap between students and their teachers (Bennett et al., 2011; Prensky, 2001). The rise of the digital age facilitates information exchange and this is changing the world in that new apps may offer us new ways of doing things (Lichtman, 2014). Students are now of the first generations to grow up with digital technologies as commonplace and today's students may spend their whole lives surrounded by computers, video games, digital music players, video cameras and mobile phones (Prensky, 2001). However, the age is not the only reason for being digital native but also, experience, self-efficacy and education are considered as characteristics of digital native (Helsper & Eynon, 2009). Besides, Prensky claimed later that "the world is now waking up to the fact that technology alone — although it is a foundation of education in the future — does not solve all, or even most, of our educational problems" (Prensky, 2015:3). The call to be future-ready is intended to prompt educational systems to prepare their students for success in future learning, work and life (Sharples et al., 2016).

The focus of this study is on tablet computers as, while there exist many studies on mobile technologies in KSA (Al-Wabil, 2015; Almutairy et al., 2015; Narayanasamy & Mohamed, 2013; Nassuora, 2012), none of these deal with tablet computers in particular. Higher education in KSA does acknowledge the use of mobile applications but has not yet considered the range of possibilities offered by tablet computers and neither do they feature in the higher education system (Nassuora, 2012). Before studying the impact of the use of tablet for teaching and learning, I think it is better to understand the acceptance and motivation of students when they use tablet computers for learning.

It is important to understand the factors that influence users' intentions and what leads them to engage with mobile learning tools. It is interesting to research this with specific regard to tablet computers in the dynamic and competitive industry of higher education. The factors are not only considered to be important to the learning process, but also, such understanding helps higher education policy makers to develop better learning tools and platforms (Shin et al., 2011). This

research aims to understand students' motivation and acceptance of tablets use in their learning and intends to examine the influencing factors by proposing a model based on the technology acceptance model (TAM) as well as self-determination theory (SDT).

This research also explores the preferred ways of learning with tablets and discusses the barriers to tablet use in HE based on students' perspectives, so that students can use these devices in more fruitful ways. The findings of this study will draw implications for KSA HE policy makers after acquiring a better understanding of the situation.

1.3.1 Justification for Choosing Tablets Computers

Tamim et al. (2015) presented the findings of a systematic review and concluded that research on the use of tablets in teaching and learning is still in its early stages. Thus, the use of tablets in the classroom context still needs to be validated. The tablet is the most recent technological innovation which is believed to support and enhance the teaching and learning processes (Tamim et al., 2015). According to this generation, tablets are the most convenient form of accessing information, and in KSA, most children have their own tablets or use family tablets.

Tablets lie between smartphones and laptops, meaning that tablets share some of the best features of both smartphones and laptops, such as being handheld devices which also have a keyboard. Although tablets have features which are already available in laptops or smartphones, tablets offer the best of both worlds, being smaller and lighter than laptops but offering larger screens than smartphones (Mang & Wardley, 2013). In addition, tablets have been chosen over laptops and smartphones as the study aims to clarify to policy makers the benefits of tablets use for higher education students. Laptops, which have almost the same characteristics of tablets, are not handheld like tablets which can be used without a SIM card, making them less distracting to students than smartphones (Goundar, 2011).

The future of mobile learning is moving towards augmented realty (AR) and virtual reality (VR) although few studies have dealt with these topics so far (Zheng, 2015). AR is "a real-time direct or indirect view of a physical real-world environment that has been enhanced/augmented by adding virtual computer-generated information to it. AR is both interactive and registered in 3D as well as combining real and virtual objects" (Carmigniani & Furht, 2011:3). VR "induces targeted behaviour in an organism by using artificial sensory stimulation, while the organism has little or no awareness of the interference" (Lavalle, 2017:1). AR systems can thus provide students with a personalised platform and support and help them construct personal knowledge as they experience real-world contexts (Chen et al., 2013). The beauty of AR and VR is that students are able to learn by

experiencing and doing, rather than simply by reading and memorising. The tablet computer is a tool that can facilitate mobile learning using AR technology.

1.3.2 Justification for Choosing Higher Education

The growing demand for mobile devices as learning tools will push higher education institutions to focus on creating suitable learning environments on campuses by providing mobile-friendly platforms (Aziz, 2015; Boakye, 2016). However, there is still a lack of understanding of the key factors that influence students' motivation and acceptance to use mobile devices with specific regard to tablet computers as m-learning tools in KSA higher education. Therefore, it is important to bring a better understanding to this area. One of the reasons that this study has selected King Abdulaziz University (KAU) as the particular context of the study is that it is always seeking to improve in the area of technology.

1.4 Research Gap

From the rationale above, it appears that there is a gap in the literature which this study aims to bridge (Figure 1). Some studies have investigated the acceptance of m-learning by using technology acceptance models (Wang et al., 2009; Park et al., 2011; Liu et al., 2010) or have touched on tablet use when exploring technology acceptance, as in El-Gayar et al. (2011), Anderson et al. (2006), El-hussein & Cronje (2010) and Moran et al. (2010). In addition, a number of studies have linked technology acceptance with motivation (Davis et al., 1992; Howard et al., 2010; Lee et al., 2005), while others have studied motivation and mobile learning or tablets together (Dekkers et al., 2012; Martin et al., 2013). However, to the best of the researcher's knowledge, no study to date has investigated university students' motivation and acceptance of tablet use in learning. This study therefore aims to bridge this gap by conducting research in the context of higher education in KSA.

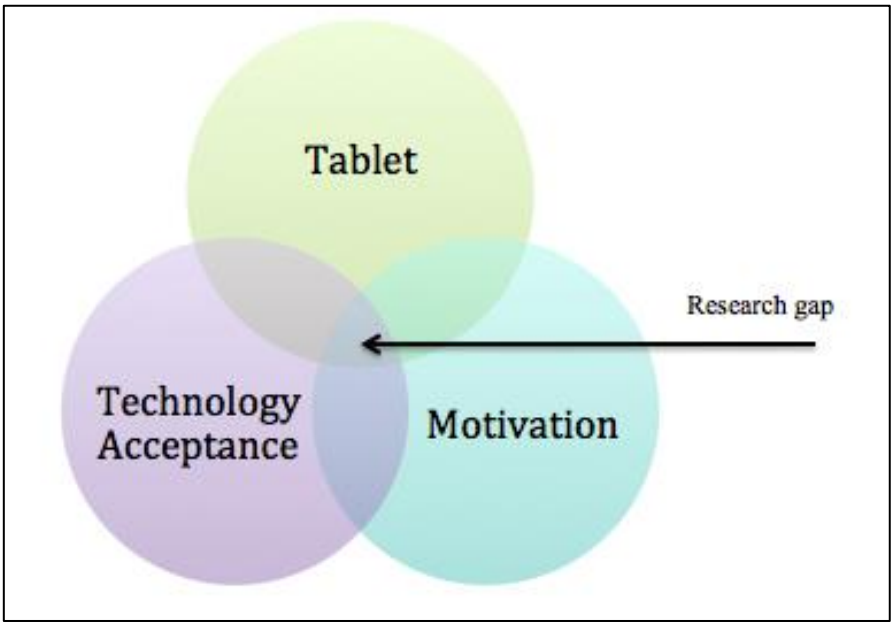

Figure 1 Research gap

1.5 Statement of Purpose

The purpose of this research is to bring a better understanding of female undergraduate students' motivation to use and their acceptance of tablet computers and to investigate how tablets can be used for learning in higher education by establishing empirical evidence of the factors that influence students' motivation for and acceptance of tablet computer use and to develop a model in this context by using mixed methods. This will be achieved through the development of a model of motivation and acceptance of learning with tablets (MALT) which will represent the new understanding.

1.6 Research Questions

The main research question addressed by this study is,

"What are the factors that influence female undergraduate students' motivation and acceptance of the use of tablet computers for learning and how significant are the interrelationships between them?"

The sub questions are:

1. What are the moderating variables that affect the relationships between the variables in the MALT model?

2. What are the barriers to tablet use in higher education according to students' perspectives?

3. What are the students' preferred ways of learning with tablets?

4. Can MALT model bring a better understanding of female students' motivation and acceptance of tablet computers use for learning in the KSA higher education context?

1.7 The Focus of the Study

This research seeks to provide a better understanding of female students' use of and attitudes towards using tablet computers for learning in the higher educational context. It seeks to explore the factors that influence students' motivation to use and acceptance of mobile technology with specific reference to tablet computers in the HE context in the Kingdom of Saudi Arabia, and aims to find the significance of the interrelationships between them. Thus, this research develops a model to study these factors, based on a literature review, and then verifies this model from students' perspectives through semi-structured interviews. The complete model is then validated from students' perspectives through an online questionnaire and is finally validated from TAM experts' perspectives. Moreover, the research explores a number of ways in which tablets can be used and identifies barriers to tablet use in learning. This study can be categorised as exploratory sequential mixed methods research due to its applied nature and relevance to educational perspectives, and also for its consideration of both qualitative and quantitative data which is gathered and analysed in sequence.

1.8 The Aim and Objectives of the Study

The aim of this research is to bring a better understanding of female undergraduate students' use of and attitudes towards using tablet computers for learning through identifying the factors that influence students' motivation to use and acceptance of learning with tablets in HE and to find the significance of the interrelationships between them. It also explores female students' preferred ways of learning when using tablets as well as the barriers to tablet use.

The objectives of the study are to:

Literature Review

- Identify the affordances of mobile learning, with particular focus on tablet computers in higher education and with reference to international research.

- Describe the body of literature relating to learning with tablets in KSA and identify the academic gap.
- Explore the factors that influence students' motivation to use tablets and their acceptance of this form of m-learning, with reference to current models and theories.
- Develop the initial version of the *Motivation and Acceptance of Learning with Tablets* (MALT) model.

Students' Interview

- Explore the factors that influence students' motivation to use and acceptance of learning with tablets, from the students' perspectives.
- Explore the most preferred ways of learning with tablets as well as the barriers to tablet use in higher education.
- Develop a revised version of MALT after analysing the findings from the student interviews.
- Develop an instrument (online questionnaire) to measure the factors involved.

Online Questionnaire

- Identify the relationship between the factors of the model by analysing the responses of students.
- Verify the preferred way of using tablets and the barriers to tablet use in higher education.
- Revise MALT according to the questionnaire findings.

Experts' Reflection

- Ask TAM experts to reflect on the model from their perspectives.

Implications

- Draw implications for KSA HE policy makers after acquiring a better understanding of the situation.

1.9 The Structure of the Study

The **Introduction** provides the basis of the research by explaining the background to technology use in a learning context. The rationale for the study, research gap, statement of purpose, research questions, and aims and objectives are identified. In addition, the introduction describes the focus of the study.

There are seven further chapters:

Chapter 2: **Literature Review** discusses the concepts and relevant evidence available in the areas of mobile learning and tablet computing. In this discussion, aspects of higher education in the Kingdom of Saudi Arabia are especially emphasised. The review also explores the theories underpinning this study, which are the technology acceptance model (TAM) and self-determination theory (SDT) as a motivational model. Moreover, justifications for choosing the TAM and SDT are made, along with reasons for the rejection of other models. The **Proposed Model** is presented at the end of this chapter. This is a new theoretical framework, based on the literature review, which has been named the *Motivation and Acceptance of Learning with Tablet (MALT)* model, and which analyses the factors that influence students' motivation to use and accept tablet computers in learning in the HE context.

Chapter 3: **Research Design** describes the positionality of the researcher. It then describes research structure of the exploratory sequential mixed-method approach and explains the characteristics and challenges of the mixed methods approach and justifies the use of the semi-structured interview and questionnaire methods of investigation. This chapter also explains the sampling procedure, pilot study scheme, lays out the ethical considerations, and discusses the validity and reliability of the methods and the data analysis procedures.

Chapter 4: **First Phase: Development of the Model** gives the research results and presents the qualitative data collected in the semi-structured interviews. The second version of the MALT model is then presented and definitions are provided for each of the constructs used in the model.

Chapter 5: **Second Phase: Verification of the Model** lists the research results of the exploratory factor analysis, confirmatory factor analysis and structural equation modelling along with the result of the qualitative data collected in the open-ended questionnaire. The third version of the MALT model is presented and defined.

Chapter 6: **Third Phase: Reflections on the Model** looks at the MALT model from the perspective of TAM experts, and presents the qualitative data collected in the semi-structured interviews.

Chapter 7: **Discussion** discusses the findings of the three phases, with respect to answering the research questions.

Chapter 8: **Conclusion** sums up the whole study and describes the study contribution to the existing body of knowledge, provides recommendation to educators and policy makers in higher education in KSA. It also explores the limitations of the study and looks at the possibilities for future research.

Chapter 2: Literature Review

2.1 Introduction

In order to establish the rationale for a study of tablet computers use in higher education, this chapter presents a brief background to the nature of mobile technology, mobile learning, followed by a review of tablet computers. It also presents a summary of the technology acceptance model and the motivation model, since these two underpin the theoretical framework of the proposed model arising from this study.

2.2 Mobile Technology

Mobile technologies are widely accepted and understood and are now considered to be a normal part of everyday life (El-Hussein & Cronje, 2010). The many kinds of mobile technologies which are currently available are very popular because they are wireless, portable, and enable users to communicate while on the move (El-Hussein & Cronje, 2010). Mobile technologies can be particularly useful to the rural population (Hylén, 2015; Thomas, 2012). In rural areas of developing countries, for example, patients have used mobile devices as their only link to the outside world, and as a way of receiving periodic health service messages (Thomas, 2012).

Mobile technology is considered to be affordable, and as such it holds great potential for reaching marginalised groups and providing them with access to further learning and improvement (Mehdipour & Zerehkafi, 2013). It is widely used by the community and is affordable by most members of Saudi society. On the other hand, researchers have asserted that the cost of tablets can be prohibitive when applied to large scale adoption by educators (Mang & Wardley, 2012; Mohseni, 2014). However, it was found that the price of the tablet was not an issue for students in a University of Ulster project, and it was expected that this would encourage its adoption (Paris, 2005). Moreover, tablet prices continue to decrease, and so all of these functions are becoming available to schools at lower cost (Clarke & Svanaes, 2014).

Mobile technologies are easy means to maintain literacy skills and gain access to information (Mehdipour & Zerehkafi, 2013) although they could cause distraction (Butcher, 2014) or create a sense of isolation for students (Corbell & Valdes-Corbell, 2007). According to Traxler (2007), mobile technologies are more difficult to ignore than traditional desktop technologies, since mobile technology now plays such a vital role in our day-to-day lives for a variety of different purposes. Some of these main purposes of the use of mobile technology are accessing information and

learning. However, mobile technology has a number of limitations, for example the small screen size of most of the devices and the exponential increase in the number of messages sent by SMS (Short Message Service) which can lead to distraction. Consequently the expectation has now arisen that mobile technology devices can transform education and support the learning experience of students, since these devices offer fun and engaging ways of learning, connecting, and communicating. This is known as mobile learning or m-learning. The following section explores this in more detail.

2.3 Background to Mobile Learning (M-learning)

As the trend of educational media is moving towards more portability and individualisation, forms of learning have changed dramatically (Liaw & Huang, 2011). The development and widespread use of mobile technology has led to its integration in some educational sectors, resulting in the concept of mobile learning (m-learning). The m-learning environment provides a flexible and powerful learning opportunity (Liaw & Huang, 2011). A decade ago it was observed that research on m-learning was sparse and patchy (Paris, 2005). However, since 2005 there have been many studies on m-learning, for example, El-hussein and Cronje (2010), Fabian & MacLean (2014), Grunwald Associates LLC (2013), Jun and Zhi-yi (2010), Melhuish et al., (2010), Motiwalla (2007), Oller (2012), Parsons (2014), Rachel et al. (2006), Robledo (2012) and Sharples et al. (2007).

M-learning offers a modern way to support the learning process via mobile devices (Mehdipour & Zerehkafi, 2013). It can involve smartphones e.g. iPhone, Android and Blackberry; laptops; tablets e.g. iPad, Android devices and Kindle; personal media players e.g. iPod, and gaming devices such as the xBox 360. Some mobile devices such as phones and tablet computers are less expensive than desktop computers, although the price of an internet connection can be higher (Alsaadat, 2009).

M-learning is a relatively new learning approach which has become an emerging learning trend for those education systems with access to mobile devices, internet and wireless technologies (Narayanasamy & Mohamed, 2013). Teachers, academic staff and students are increasingly using m-learning to access information quickly and conveniently. Moreover, m-learning is set to play a vital role in the development of teaching and learning for higher education. Nevertheless, its successful implementation will depend on users' acceptance of mobile devices (Abu-Al-Aish & Love, 2013).

It is believed that learning with wireless/handheld devices will never replace classroom learning (Liaw et al., 2010). However, Motiwalla (2007) claims that mobile technology devices can supplement and increase the value of current learning models such as conversation theory (Pask,

1975) and the social constructive theory (Brown & Campione, 1996) of learning with technology. Conversation theory states that in order for successful learning to take place, continuous two-way conversations and interactions are required between the teacher and learner or between learners. The constructive learning model proposes that learners have to act and reflect in an environment according to their experiential knowledge, and it has been suggested that m-learning would support both of these learning theories (Motiwalla, 2007). Thus, m-learning encourages widespread adoption of models of online-collaborative learning (Paris, 2005). Moreover, m-learning can make learning truly personalised in the way that the learners have the option to choose learning content depending on their interest, thus making the experience very learner-centric (Narayanasamy & Mohamed, 2013).

M- learning is thought to be most useful in the way it supplements ICT, online learning and more traditional learning approaches, and can do much more to enrich the learning experience (Alsaadat, 2009). It is believed that m-learning could be an important factor in getting young adults to engage more in learning, where more traditional techniques have failed (Alsaadat, 2009). Thus, one of the main goals of Education For All (EFA) by UNISCO is to ensure that the learning needs of young adults are met through reasonable access to proper learning and life skills programmes (UNISCO, 2015). Nevertheless, students may use mobile devices to distract themselves during lessons (Pollara, 2011). In Butcher study, it has been found that some students perceive tablets as frustrating and a distraction from learning (Butcher, 2014). This may depend on the teacher ability to integrate tablet with the pedagogy in an acceptable way.

The following sections describe the difference between m-learning and e-learning, introduce the definition of m-learning, describe the benefits and limitations of m-learning in higher education and discuss mobile learning in the Kingdom of Saudi Arabia.

2.3.1 The Difference Between M-Learning And E-Learning

Before defining m-learning, the difference between m-learning and e-learning needs to be established, as many people confuse the two, or believe them to be the same thing. The relationship between m-learning and e-learning is discussed in the literature, where some researchers consider m-learning to be a subset of e-learning (Brown, 2003; Pollara, 2011). For others, m-learning and e-learning are the same but differ in the delivery mechanisms (Martin, 2011). Another definition of the relationship between e-learning and m-learning is that m-learning is not fully a subset of e-learning, as m-learning can be found outside the boundaries of e-learning. This means that e-learning does not always include m-learning (Abu-Al-Aish & Love, 2013).

Although m-learning and e-learning are related, there are important differences between them, as illustrated in Table 1.

Table 1 The difference between m-learning and e-learning (Behera, 2013; Brown, 2003; Ma & Yuen, 2011; Mehdipour & Zerehkafi, 2013)

Area	M-learning	E-learning
Definitions	M-learning has the potential to provide information to people at any time and in any place using portable learning devices.	E-learning is defined as a teaching and learning environment located within computer- mediated communication and work "spaces" and facilities, which are constructed in software.
Types	The handheld devices e.g. tablets, smartphones, mobile phones	The full range of technologies e.g. personal computers, smart board, scanner
Features	Accessibility, interactivity and flexibility. Technology enhanced learning. Permanency of information. Lightweight. Used anywhere at any time. Lower price than PCs.	Computer/technology enhanced learning. Empowered by digital technology.
Advantages	Convenient and interesting. Handheld devices. Increased mobility. Time-saving. Environmentally-friendly. Interactive. Learning on-the-go, support learning styles.	Interesting. Caters for different learning styles. Provides on-line, off-line and live interaction.
Disadvantages	Storage is limited. Display and keyboard are small. Network connectivity limitations.	Lack of equipment. More time-consuming to set up.
Similarities	Both need technological systems. Provide self-learning. Learning content is delivered in the form of texts, images and video clips. Learning material can be updated continuously.	

Differences	Mobile learning uses kind of wireless when accessing the internet anywhere at any time. Mobile learning uses wireless communication devices.	E-learning access to the internet is achieved via the available telephone service. E-learning uses fixed, wire devices such as PCs.
Communication	Spontaneous Flexible 27/4 instantaneous messaging	Scheduled Face-to-Face e-mail-to-e-mail

E-learning systems can improve both the access to and effectiveness of learning and as such they play a key role in the marketplace of organisational learning (Ma & Yuen, 2011). The term e-learning has been in use for the last decade and has many definitions (Aziz, 2015). According to Ali (2012), e-learning is a model resulting from the use of information and communication technology (ICT) to enhance, improve and/or support traditional teaching methodology and practices. Another definition is that e-learning is a teaching and learning environment located within computer-mediated communication, work spaces and facilities, which are constructed in software (Ma & Yuen, 2011). Nevertheless, there are still issues in e-learning, such as time limitations, low-bandwidth networks and fixed location (Adewole-Odeshi, 2014; Aziz, 2015). In order to solve such problems, scholars and researchers are now focusing on m-learning (Huang et al., 2007; Sharples, 2006; Traxler, 2007; Wang, et al., 2009).

M-learning is considered as the next generation of e-learning (Aziz, 2015; Narayanasamy & Mohamed, 2013), which can provide easy access as well as wide availability to students with more collaborative learning opportunities (Pollara, 2011). Thus, it would be a mistake to assume that m-learning is e-learning on a mobile device (Turner, n.d.), since m-learning is different in that all communication is wireless (Paris, 2005) and it requires a different pedagogical approach to e-learning for a number of reasons. First, ways of accessing m-learning are different from e-learning in that mobile phone screens limit the amount of information that can be shown at any one time, compared to an office-based desktop computer or full-size laptop (Pollara, 2011; Turner, n.d.). Second, m-learning is about learning in just-in-time and on-demand in response to the needs of the user, whereas in e-learning, learners are expected to learn information and retain it for a later time, applying it in a task or exam (Mehdipour & Zerehkafi, 2013). Finally, the learning experiences of m-learning and e-learning differ in that m-learning means that learners can learn by themselves, on their own or collaboratively using their own wireless/handhelds device in a situated context

(Melhuish & Falloon, 2010; Turner, n.d.). Thus, m-learning provides learning opportunities that are unlike those provided by e-learning (at a desktop) or paper-based learning (Alsaadat, 2009).

2.3.2 Definition of Mobile Learning (M-Learning)

Over the past ten years, m-learning has grown to be important in schools and workplaces, cities and rural areas around the world (Alsaadat, 2009). However, the m-learning concept differs according to different national perspectives, differences between academia and industry, and even within and between schools, higher education and lifelong learning sectors (Alsaadat, 2009; Mehdipour & Zerehkafi, 2013).

Paris (2005) has argued that defining m-learning is problematic in terms of scope, but there are a number of definitions to be found in the literature. Attewell & Savill-Smith (2005) defined mobile learning as learning by means of wireless technology devices that can be carried around easily and used wherever there are unbroken transmission signals. Traxler (2007) has defined m-learning as the use of wireless and digital devices which are mostly produced for the public, but are also used by learners participating in higher education. Another way of expressing this is as a technique which uses handheld devices together with wireless and mobile phone networks in order to facilitate, support and enhance teaching and learning processes (Alsaadat, 2009; Narayanasamy & Mohamed, 2013). M-learning can make use of any mobile and handheld technology device, such as a personal digital assistant (PDA), mobile telephone, laptop and tablet computers in teaching and learning processes (Nassuora, 2012).

El-Hussein and Cronje (2010) define and conceptualise m-learning by placing a strong emphasis on the mobility of learners and the mobility of learning, and the experiences of learners as they learn by means of mobile devices. They define it as “any type of learning that takes place in learning environments and spaces that take account of the mobility of technology, mobility of learners and mobility of learning” (p.6). According to them, mobility refers to the capabilities of the technology within the physical contexts and activities of the learners as they participate in higher learning institutions. On the other hand, it stands for the activities of the learning process and the behaviour of the students as they use the technology to learn. It also stands for the attitudes of the learners who are themselves highly mobile as they use mobile technology for learning purposes (El-Hussein & Cronje, 2010). M-learning is the learning accomplished with the use of small, portable devices (Liaw & Huang, 2011). These devices may include smart-phones, tablets and similar handheld devices. M-learning is capable of presenting learning content and providing wireless two-way communication between teacher(s) and student(s) (Paris, 2005). M-learning can, therefore, be

defined as “personalised learning by wireless technology handheld devices at the learner’s own pace, any place, anytime and on any subject with a degree of privacy” (Alomary et al., 2016:33).

A decade ago in Saudi educational system, the teacher was the main source of instruction and knowledge, and students were restricted to learning at certain times and within the four walls of a classroom. Nowadays, the accessing of information is out of teachers’ control, since the development of computers and particularly mobiles or wireless devices has meant that students can learn about anything they want to without asking teachers. Thus, m-learning plays a vital role in the education system (Brown, 2003). Indeed, m-learning is a relatively new tool in the pedagogical area and there needs to be support for students and teachers as they navigate the options available in the expanding world of distance learning (Liaw & Huang, 2011). It can be seen that the increasing use and rapid development of mobile devices has led to the emergence of the concept of m-learning, and that this is now a topic of investigation and exploration in education research. For example, (Williams & Pence, 2011), in their study of chemistry students, found that smart phones could enhance learning.

2.3.3 The Benefits of Mobile Learning

Students do not need to be a certain age, gender or member of a specific group or geography to participate in m-learning, for example, in KSA most children have their own devices from a very young age. M-learning can be used at any time, and in any space or place (Behera, 2013). It offers new solutions to conventionally problematic contexts of information delivery. There are many studies that emphasise the opportunities of access afforded by mobile learning and students whose needs can be met by m-learning include mature-aged, gifted, international and remote students, and also those who have cognitive, behavioural or social problems, or physical or mental difficulties (Cobcroft et al., 2006; Savill-Smith & Kent, 2003; Strom & Strom, 2002). Moreover, m-learning can support improvements in literacy and numeracy skills; encourage independent and collaborative learning experiences; identify areas where students need assistance and support; engage unwilling learners; enable learners to remain more focused for longer periods and promote self-esteem and self-confidence (Brown, 2003; Hylén, 2015; Cobcroft et al., 2006). Many researchers suggest that those students who use mobile devices for learning purposes are motivated and engaged in learning and accordingly increasing their achievement levels (Aziz, 2015; Rogers et al., 2010; Wang et al., 2009).

Furthermore, m-learning is a type of informal learning which can be characterised by the phrases ‘just-in-time’, and ‘just-for-me’ (Turner, n.d.). ‘Just-in-time’ means the learner can use their mobile device for learning at any time, and the device is ‘just-for-me’ because it enables personalised one-

to one interaction between the individual and the device (Liaw & Huang, 2012). Thus, the independence from place and time allowed by m-learning helps students to utilise their spare time more flexibly (Liaw & Huang, 2011). Other advantages of m-learning are that it is easier to find space for several mobile devices in a classroom than several desktop computers (Nassuora, 2012).

Mehdipour and Zerehkafi (2013) reported that the value and advantages of m-learning are that m-learning is a useful add-on tool for students with special needs, it decreases training costs, provides reasonably inexpensive opportunities and delivers multimedia content delivery. In addition, mobile devices are more lightweight and convenient than books and PCs. However, the learners need to know where to look, and how to filter and use information, so they can use mobile devices for learning in a fruitful way. Therefore, educators need to know how to instruct students in using these devices effectively (Rossing et al., 2012).

Other advantages of m-learning are that it increases mobility, as using mobile devices allows students to access learning content and learning interactions anywhere, which saves time. It is also environmental-friendly, interactive, supports media, gives opportunities for learners to give immediate feedback on their learning experience, and learner are stimulated in their learning (Behera, 2013). M-learning provides students with the opportunity to learn while on-the-go (Brown, 2003).

M-learning allows collaborative work in which students and teachers can e-mail, cut, copy and paste text, and pass the device around a group (Nassuora, 2012). Although we can find useful overviews of different m-learning applications, we still need a better representation of the educational potential of m-learning with which to approach educational policy makers (Liaw & Huang, 2011). As a result, it can be concluded that m-learning offers better opportunities for learners to acquire knowledge and skills at their own pace, whenever, wherever, and with a degree of privacy. Such benefits demonstrate the educational usefulness of m-learning.

2.3.4 The Limitations of Mobile Learning

Although there are benefits to mobile learning, a number of researchers have found limitations to its full adoption (Rossing et al., 2012). One of these is that it suffers from the limited battery life of mobile devices as well as their limited memory capacity (Mehdipour & Zerehkafi, 2013; Narayanasamy & Mohamed, 2013). Moreover, it is vital that the educational institute provides full support to the students and faculty members who use this type of learning (Corbell & Valdes-Corbell, 2007). In addition, difficulties in assisting students' learning outside the classrooms can be considered as a disadvantage of using m-learning (Mehdipour & Zerehkafi, 2013). Furthermore, Corbell & Valdes-Corbell (2007) caution that m-learning activities could create a sense of isolation

for students, particularly those who are not familiar with using technologies. There are risks of sudden obsolescence as well as distractions (Mehdipour & Zerehkafi, 2013). According to some studies, teaching staff are concerned that students use mobile devices to cheat in assessments (Martin, 2011) and to distract themselves during lessons (Pollara, 2011). Mehdipour & Zerehkafi (2013) reported that the size of mobile devices and failure of wireless Internet (Wi-Fi) connectivity are problems of m-learning and can cause frustration and disappointment to students. In order to implement mobile devices in classrooms, there is a need of a wireless so as to get the actual benefit from this implementation (Ali, 2012). These limitations need to be considered when planning to use m-learning in the classroom.

2.3.5 The Use of Mobile Devices in Learning

In one study, students were able to consider their own learning styles when using mobile devices and were found to prefer mobile applications to aid learning rather than traditional means (Pollara, 2011). Students use their mobile devices to engage in supplemental activities and organisational tasks in addition to accessing course materials and information inside the classroom (Hylén, 2015). Moreover, students use mobile devices as study tools, for example by downloading applications to learn concepts related to courses. They often played a variety of educational games using their mobile device (Pollara, 2011).

The majority of teaching staff in Pollara's study (2011) reported that they thought students used their mobile devices for socialisation. It was also found that students were more comfortable using their mobiles when asking for learning help. Outside the classrooms, students use their mobile devices intensively to complete their assignments, access information, work with digital video and images, play games, listen to music, browse the internet, write and reflect and use instant messaging and email including independent and group related study tasks (Boakye, 2016; Martin, 2011). It is expected that increasing numbers of students will choose mobile learning for its usability and interactivity in augmented reality (AR) technology (Zheng, 2015). Definitions of AR are given in the introduction chapter. The use of AR in m-learning is still in its infancy and it remains to be seen how useful it is for creating effective learning experiences (Chen et al., 2013; FitzGerald et al., 2012; Zheng, 2015).

2.3.6 Integrating Mobile Learning in Higher Education

Mobile technologies have improved dramatically in recent years, attracting considerable interest from the education sectors (Melhuish & Falloon, 2010). However, although mobile technology has been used in a minor way in learning activities such as lectures and assignments, it has not yet been

considered as a main source of delivery in higher education (Boakye, 2016; El-hussein & Cronje, 2010). In other words, few have considered mobile learning as a main pedagogical resource in higher education institutions. Designers and developers of information and communication technology should begin to consider the implications of mobile technology in the modern teaching and learning environment. Designers can deliver successful higher education products to the present generation of learners by means of mobile technologies. This makes mobile technology a particularly effective tool for the delivery and reinforcement of content specific to the higher education context (El-Hussein & Cronje, 2010). In a study by Al-Husain and Hammo (2015) at King Saud University in Kingdom of Saudi Arabia (KSA), m-learning was perceived by respondents to be effective both in informal learning and in communication; the respondents in this case were digital natives and university students as they claimed. Another study also found that mobile devices were perceived as effective in improving communication and learning in HE (Al-Fahad, 2009).

Administrators and faculties are becoming increasingly concerned about the capability and usefulness of wireless and handheld devices in the context of higher education learning (Motiwalla, 2007). This is could be the reason why m-learning systems are not widely used. For instance, some administrators ask whether students should be learning at the airport or a train station with all the surrounding environmental distractions. However, many researchers have conducted studies to test the role of wireless and handhelds devices for learning (Bollen et al., 2004; Farooq et al., 2002; Stone et al., 2002). According to Huang et al. (2008), the environment in which mobile learning is conducted should include features such as enhanced availability and accessibility of information networks. It should engage students in learning-related activities in diverse physical locations, improve communication and collaborative learning in classrooms, and enable quick content delivery. Nevertheless, mobile learning offers tremendous potential for learning support, and indeed mobile technologies have already been used to support the study of many different subjects in HE (El-Hussein & Cronje, 2010).

Higher education institutions should not only focus on delivering content to students. They need to enable and motivate students to find, identify, manipulate and evaluate existing knowledge, to integrate this knowledge in their world, to solve problems and to communicate this knowledge with others (Brown, 2003). M-learning provides fast, easy and convenient ways to communicate and interact (Nassuora, 2012), and is possible that today's students may prefer m-learning to more traditional methods (Prensky, 2001). It provides mobility in that students can study at their own pace, whenever, wherever, and with a degree of privacy (Brown, 2003). According to El-hussein & Cronje (2010), given the rapid advances in mobile technology, m-learning is likely to become one of the most effective and useful means of instruction delivery in HE. Although it is noted that

students are using their mobile devices to enhance learning outside of the classroom, there is limited research supporting the use of these tools in higher education (Foti, 2014).

Liaw and Huang's study (2011) exploring students' attitudes towards the m-learning environment revealed that although mobile technology devices are limited as to screen size, they remain valuable tools for mobile learning in HE. This is largely because mobile learning systems are more individualised and learner-centred. It is expected that m-learning will be the most effective method of delivering higher education materials in future (El-Hussein & Cronje, 2010). The appropriate design of technology will lead to the better effectiveness of m-learning; therefore, designers and practitioners of education should take into consideration the design of mobile devices which would suit the higher education context (El-Hussein & Cronje, 2010). It is also important to describe fully the different advantages and disadvantages of mobile devices as tools for delivering instructional content in higher education and how they can best be used to support learning.

The increasing use of mobile technology at colleges and universities is the most recent trend which is forcing educators to evaluate the qualities and limitations of this new technology (Rossing et al., 2012). Hence, university administrations should emphasise the design of a viable m-learning system that would be suitable for students and be supported by university policy (Nassuora, 2012). These are important factors that lead to a successful m-learning system in HE.

2.3.7 Mobile Learning in KSA

Mobile learning has recently become popular in Saudi Arabia, particularly with young Saudi students (Narayanasamy & Mohamed, 2013). In KSA, approximately 90% of students use a smart phone (Alahmad, 2014). The mobile infrastructure in KSA is well established, with the result that most citizens acquire mobile devices with improved features every year; it has been found that almost all at Jazan University own at least one mobile phone (Narayanasamy & Mohamed, 2013). The Qassim College of Medicine in KSA claims to have launched the first m-learning programme in the country (Garg, 2013). The m-learning concept differs according to different national perspectives, differences between academia and industry, and even between schools, higher education and lifelong learning sectors (Alsaadat, 2009). In 2012, it was argued that in developing countries such as KSA, the concept of a learning tool which can be used at anytime and anywhere was focused on the laptop (Nassuora, 2012). Nowadays, students at KSA realise that they can use their mobile phones and tablets to learn anywhere and at any time.

The adoption of m-learning differs from country to country and so it is best that researchers investigate this situation within a single country (Nassuora, 2012); the factors that influence the use of m-learning are another important consideration. Nassuora (2012) has studied the acceptance of

m-learning in higher education students in Al-Faisal Private University, KSA. The study gathered data from approximately around 80 students in 2011 to investigate factors that had a positive relationship with behavioural intention to use m-learning based on the UTAUT model. The results of the statistical analysis showed that the acceptance level of m-learning was high and that students had good perceptions of m-learning. Effort expectancy and facilitating conditions also scored high levels of acceptance. Another study by Narayanasamy and Mohamed (2013) investigated 300 undergraduate students' awareness of m-learning at Jazan University, KSA. The results showed that students have sufficient knowledge and awareness of m-learning and provided strong evidence for the acceptance of mobile technologies for learning. In addition, the results of a case study in KSA indicated that although m-learning makes education more convenient than in the past, it requires good wireless network bandwidth in order for it to work well (Alkhalaf, 2015). However, the study also showed that students continue their learning activities outside class time wherever a Wi-Fi network is available.

Almutairy et al. (2015) conducted a study investigating the extent to which 131 Saudi students at UK universities understood and were familiar with m-learning and the use of handheld devices. The research also evaluated m-learning in KSA (Almutairy et al., 2015). The study confirmed that Saudi students are confident when using mobile devices in their daily lives and that they would welcome more opportunities for mobile learning. An interesting finding from a study by Al-Wabil (2015) in KSA is that public universities have taken the lead in providing mobile applications rather than the private universities.

Undergraduate students participating in a study at King Saud University, KSA, showed high levels of readiness to use m-learning and it was established that there is a demand for university support of m-learning technology (Al-Husain & Hammo, 2015). Further research also found that readiness to use m-learning among students at Taibah University, KSA, is also high (Al-Said, 2015). In yet another study, the majority of students in the sample, who were from a variety of disciplines, felt that the availability of wireless networks had increased their ability to work independently. The participants in the study were engaged learners who were behaviourally, intellectually and emotionally involved in their learning tasks (Al-Fahad, 2009). The interest in m-learning in KSA has grown immensely within the past few years because of increased advances in mobile devices and wireless networks (Al-Wabil, 2015; Garg, 2013). In KSA, the acceptance of new mobile devices is also growing (Garg, 2013). Thus, m-learning has been widely accepted in KSA, and the country is currently investing greatly in ICT for schools (Garg, 2013) and higher education (Al-Wabil, 2015).

2.3.8 Summary

M-learning refers to personalised learning which refers to the users' own device by wireless technology handheld devices at the learner's own pace, any place, anytime and on any subject with a degree of privacy. It can make learning truly personalised in that learners use their own devices as one-to-one interaction, have the option to choose content depending on their interests, so that pedagogy is changing from a teacher-centric to a learner-centric approach with m-learning. It is considered as a subset of e-learning or as the next generation of e-learning. The limited battery life of devices and adequate support from educational institutions are considered as limitations in the adoption of m-learning in HE. However, m-learning can provide an opportunity for the new generation of students to enjoy better communication and learning activities without taking into account place and/or time.

The tablet computer is ideally suited to m-learning. Educators need to consider that if they ignore the possibilities offered by tablet computers, they may miss the opportunity presented by these devices to promote collaborative, informal and interactive learning. Tablets provide flexibility in that students can study at their own pace, whenever, wherever, and with a degree of privacy (Brown, 2003). However, it is true to say that the deployment of the tablet computer for learning has not yet been implemented in this study context. The next section gives a brief overview of tablet computers.

2.4 Tablet Computers

2.4.1 Tablets Definition and Background

Tablet computers (tablets) are personal and portable information manipulators, according to Mohseni (2014). Paris (2005) has defined tablet computers as "based on laptop computers but with extra functionality…the tablet is essentially a fully functional computer which enables a user to write directly on the screen with a stylus, or switch to keyboard input, and to connect to the Internet or set up ad-hoc, peer-to- peer wireless networks". Todays Laptops are touchable but they are not handheld devices. Johnson et al. (2013) define the tablet computer as a device that does not require a mouse or a keyboard although these can be easily plugged into a tablet and are preferred by some users. Therefore, amongst mobile devices and other technologies, researchers agree that the tablet computer is a useful tool for educational purposes and that it can be used very effectively to facilitate student learning and interaction, and to increase student motivation and engagement (Fischer et al., 2013; Kothaneth et al., 2012; Mohseni, 2014). However, its use in the learning process can be problematic (Butcher, 2014; Mang & Wardley, 2012; Schnackenberg, 2013).

2.4.2 Tablets, Laptops and Smartphones

Tablet computers now have more functionality than desktop computers and by using them with wireless networks, users can download and read books, watch videos, learn foreign languages and much more via a large, high-resolution touch-screen which makes the experience convenient, vibrant, and shareable (Butcher, 2014; Johnson et al., 2013). Thus, they enable learning to extend beyond the traditional classroom (Alsaadat, 2009). In 2010, the Apple iPad was released as a completely new type of mobile device, being distinct from smartphones, ultra-small laptops, e-readers, and other types of portable devices. The iPad is the market leader in tablet computers in 2014 (Mohseni, 2014), although there are many others now which offer similar functions, such as Samsung's Galaxy Tab, which uses Google's Android operating system, the Blackberry Playbook, Amazon Kindle Fire and Google Nexus. Thus the appearance of tablet computers marks a paradigm shift in the computing industry (Paris, 2005) although the functionality of laptops (Romney, 2011) and traditional personal computers (PCs) ensures that they will continue to be used into the foreseeable future (Fischer et al., 2013).

It has become clear that tablets are not a new kind of lightweight laptop, but are rather a completely new technology (Johnson et al., 2013). Kothaneth et al. (2012) point out that while tablets are like laptops in the sense of being portable, the monitor can be rotated onto the keyboard to act like a slate. Mang & Wardley (2012) show that tablets and laptops have portability and connectivity in common. However, there is a difference that is considered as a useful feature of tablets in the context of education, is that they can reduce off-task usage during lectures, specifically the browsing of email and social networking applications, because they do not allow users to view multiple applications simultaneously. Since 2010, tablets have become much more widely available, their main selling points being portability, ease of use and relatively low cost, all of which support their use in education (Butcher, 2014). The differences between tablets, wireless laptops and smartphones are illustrated in the table below Table 2.

Table 2 The difference between tablet, laptop and smartphone (Alkhalaf, 2015; Context, 2014; Mang & Wardley, 2013)

Feature	**Tablet**	**Wireless Laptop**	**Smartphone**
Touch Screen	yes	Some	yes
Cost (based on latest versions on Apple.co.uk website)	Range between £500 to £700 depending on the display size and storage.	£1,200 to over than £2000 pounds depending on the type and storage.	£500 to £700 depending on storage.

Support Smart applications	Supported and especially educational apps with regard to Microsoft.	Not too much	yes
Light weight and handheld	yes		yes
Long battery life	yes	yes	
Take short time to start up	Yes		yes
Require less technical support	Yes		Yes
Auto rotate	Yes		Yes
Virtual and external keyboard and pen	All	Virtual and external keyboard	All
One app at one time	Yes		Yes
Phone calls and SMS			yes

From the above table, it can be noted that tablets share some of the features of smartphones and laptops. Apple states on its website that tablets now are faster than laptops (Apple, 2016). To conclude, tablets are smaller and lighter than laptops but offer larger screens than smartphones (Mang & Wardley, 2013), making them more suitable for today's students. The development of this new technology has therefore created new opportunities for the enhancement of the learning experience at all levels of learners' education. What makes tablets differ from other mobile devices is that they have larger screens, more interactive apps, greater processing power, greater battery power and the availability of audio and video recording software, which can make tablets more functional than other mobile devices. Tablet prices continue to decrease, and so all of these functions are becoming available to schools at lower cost (Clarke & Svanaes, 2014).

2.4.3 Tablets and Learning

Tablets are now acknowledged to be useful in education (Mohseni, 2014). There are many applications (apps) that facilitate learning such as those for email, web browsing, calendars and diaries, e-books, games, multimedia, writing, presentation, social media, video conferencing, cloud

storage, and much more. There were more than twenty thousand educational apps in the App Store in 2012 (Mohseni, 2014). The NMC Horizon report showed that tablets are considered as powerful tools for learning either inside or outside of the classrooms (Johnson et al., 2013) because they have Wi-Fi and cellular network connectivity, large touchscreens, and include a lot of mobile apps. Against the fixed type of ICT tools, these devices can facilitate learning in a mobile or portable form, which is favoured by the current student generation (Al-Husain & Hammo, 2015; Almarwani, 2011; Prensky, 2001). The quick access feature of tablets makes them easier and faster than PCs and laptops, and is of particular use during outdoor learning sessions. So, the versatility and flexibility of tablets provides the potential to change the learning experience of students (Liaw & Huang, 2012). Tablets combine the portability of PDAs and with the functionality of desktops, thus the learning process becomes more mobile, flexible and exciting (Alsaadat, 2009). Therefore, A tablet device has the potential to give satisfaction to students by allowing them to interact with the course contents and retrieve information from the internet at any time (Liaw & Huang, 2011).

According to Mohseni (2014), the followings show the connection between some of the elements of learning and the applications that are available for tablet computers.

1. Reading: Tablets can be useful for reading because the screen is large, touch-enabled (Romney, 2011) and rotatable. As tablets are handheld devices, learners can easily carry them around and hold them in their preferred way for reading.

2. Educational games: Tablets include many educational games and these can be considered as extra learning resources for students. Although some of these are for purchase, others are available for free download.

3.Taking quizzes: Students can take tests and quizzes using a tablet and score feedback can be provided immediately and electronically.

4. Writing: Although tablets may not be the most suitable tool for writing because of their size and the virtual keyboard, some students do write assignments on their tablets as they enjoy typing on the virtual keyboard or use pens designed to write on the screens (Romney, 2011).

Students can use their own learning style when learning on mobile devices (Pollara, 2011). Students who use their mobile devices for learning can use them to ask for help in learning, access course materials and information, download applications to learn concepts and play educational games. In particular, students can use tablets to write assignments, work with digital video and images, listen to music, surf the web, make reflective notes, and use instant messaging and email for independent and group related study tasks (Clarke & Svanaes, 2014; Martin, 2011; Pollara, 2011).

Students learning with tablets should seek to establish ways in which it can be used more effectively than other similar devices to promote learning in the classroom (Habler et al., 2015). The tablet is a mobile device, and so can be used to do all the above and support learning in new ways (Clarke & Svanaes, 2014). Tablets are used differently depending on the stage of education (Clarke & Svanaes, 2014). University students have reported that access to educational material, presentation and note-taking software and being able to communicate on the go encourage them to use tablets more in their education (Clarke & Svanaes, 2014).

The design of tablet computers combines e-reading capabilities with web-browsing, as well as an assortment of applications, or 'apps' that facilitate the integration of information by making accessibility instantaneous (Foti, 2014). For example, students can create revision flashcards using an app, or store and edit assignments using free online cloud facilities such as Google Docs and One Drive (Foti, 2014). In a study done by Fabian and MacLean (2014) it was found that students use tablets in different ways. In terms of learning content, students used tablets to read, create and share content; in terms of the range of learning activities, students were able to simulate activities (Fabian & MacLean, 2014). Thus, the use of tablets has the potential to enhance learning (Habler et al., 2015).

2.4.4 The Advantages and Current Issues of Tablets Use

Tablets are ideal tools in supporting learning as they can be used as a portable personalised learning environment (Clarke & Svanaes, 2014; Johnson et al., 2013). Users/learners can easily share content such as videos, images, and presentations and can choose their own learning apps. Furthermore, students can carry tablets from class to class very easily, and can use them to access textbooks and other course materials (Johnson et al., 2013). All of these resources, tools and other materials are on a single device which facilitates learners to take and share notes, create to-do lists, store all of their files, and organise their academic schedules. Tablets not only make productivity more efficient, but also support students in creating projects, managing time, assigning tasks, and organising ideas (Schnackenberg, 2013). Moreover, tablets can be used with different learning styles to enhance the educational experience (Kothaneth et al., 2012; Schnackenberg, 2013). Tablets adapt well to the needs of many different types of learners. Learners can use tablets to take handwritten notes and make sketches. Tablets also provide open-ended note-taking capabilities and graphics can be designed that aid in visualisation. Audio can be recorded for future playback and richer audio presentations, and students can create and interact with their learning environment.

Using tablets in learning can enhance interaction and collaboration between students (Butcher, 2014; Fischer et al., 2013; Mang & Wardley, 2012). Tablets have the potential to change the way students behave, how they interact with each other and their attitude towards learning (Liaw & Huang, 2011). Group work seems to be very successful when using tablets as students can collaborate with each other on different tasks; for example, graphics work or writing, sharing documents electronically or presenting them to the class (Mohseni, 2014). Thus, if tablets combine with wireless classrooms, learning could be enhanced through enhanced collaboration (Ali, 2012; Mehdipour & Zerehkafi, 2013).

Despite the fact that tablet computers in education are very much part of life now (Mohseni, 2014) and are useful tools in learning (Clarke & Svanaes, 2014; Johnson et al., 2013), it has been found that some students perceive tablets as frustrating and a distraction from learning (Butcher, 2014). Thus, their use in the learning process can be problematic (Schnackenberg, 2013). According to Fischer et al. (2013), tablets are not always the best tool to meet all of the computing needs of students. There is also the issue that students can and do use tablets inappropriately by playing with applications during lectures and seminars rather than using the tablet as a learning aid (Schnackenberg, 2013). Mang and Wardley (2012), however, concluded that tablets presented much less of a distraction to the students than laptops, as their findings showed that students who used tablets were less likely than laptop users to engage in off-task activities such as instant messaging, social network usage, and watching videos during a lecture. Nevertheless, Fischman and Keller, as cited in Mang and Wardley (2012), noted that trials of tablets in management classes at the universities of Stanford and Notre Dame were not successful as several students were uncomfortable with using this kind of technology and favoured more traditional technologies such as laptops.

By using software applications in tablets, students can enhance creativity and critical thinking (Mang & Wardley, 2012); they can make use of digital books and articles which leads to substantial savings in book buying and encourages better interaction between students and faculty. Moreover, the electronic versions of textbooks on tablets reduces the amount of paper students need to carry around as well as lowering textbook costs (Mang & Wardley, 2012). In addition, the main features of tablets are their mobility and portability (Butcher, 2014; Fischer et al., 2013; Paris, 2005). They are light, can connect to Wi-Fi, have a long battery life, support different tools, are considered as suitable tools for mobile learning, can be used both inside and outside the classroom and on-the-go, and are interactive and support many convenient educational applications (Butcher, 2014; Fischer et al., 2013; Mohseni, 2014).

Tablets are generally considered as an advancement in teaching and learning technology but there are still a number of challenges to overcome (Mang & Wardley, 2012; Mohseni, 2014). The main challenges of using tablets in learning are the security setup, and app administration (Fabian & MacLean, 2014) and internet access (Ali, 2012; Mehdipour & Zerehkafi, 2013). Students have registered concern about how they can store files on a hard drive or a flash when using a tablet, as currently these devices cannot be connected to external drives for transferring and/or saving files (Schnackenberg, 2013). However, the development of cloud technology whereby students can upload their files and store them virtually has provided one solution to this problem. Another disadvantage of tablets is that they are less user-friendly for work on large scale projects or papers (Schnackenberg, 2013). Two studies have shown that other drawbacks of tablets include difficulty in typing on a virtual keyboard and in writing or drawing with one's finger-tip (Weider, 2011). However, the Apple website (Apple, 2016) and Mang and Wardley (2012) show that physical keyboards and stylus pens are now available for many kinds of tablets, thus solving this problem. Qualitative research by Bennett et al., (2011) concluded that handheld devices were too expensive and could easily be lost, according to the views of participants in the study. However, there are now many inexpensive tablets available, and since adult learners are more likely to take care of their equipment, tablet use in higher education does not suffer from these issues.

Researchers have asserted that the cost of tablets can be prohibitive when applied to large scale adoption by educators and by consumers in general (Mang & Wardley, 2012; Mohseni, 2014). However, in a University of Ulster project, it was found that the price of the tablet was not an issue for students, and it was expected that this would encourage its adoption (Paris, 2005). It is argued that tablets do not have a significant effect on learning outcomes (Mohseni, 2014). Fischer et al. (2013) argue, however, that researchers have neglected the potential benefits of tablets in higher education. Despite this, interest in the potential benefits of tablets in education has grown globally in recent years (Butcher, 2014) as the new technology of augmented reality appeared. Augmented reality (AR) may become an important technology in m-learning which can be used and applied in classrooms with the aid of tablet computers (Zheng, 2015). Tablets allow learners to interact with digital information embedded within the physical environment (Dunleavy & Dede, n.d.).

2.4.5 Tablets Adoption in Classrooms

Tablet adoption in classrooms has become more of an urgent issue due to student preferences and the need for education providers to keep pace with technology (Schnackenberg, 2013). Tablets are so frequently found in classrooms around the world that many teachers now consider them as normal an accessory as a pen or a pencil (Hocanın & Iscioglu, 2014). However, the 3G tablet is not recommended for school's adoption (Learning Context, 2014). On the other hand, two factors

which need to be taken into account when considering adopting tablet use in the classroom are cost effectiveness and ease of operation (Alqhtani et al., 2013). Other factors are students' previous experiences of tablets, and the existence of a pedagogical and administrative plan for their use (Clarke & Svanaes, 2014).

Prensky (2001) claimed that students have changed radically in the ways they use technology and the tools of the traditional educational system may no longer suit them as technologies have always held great promise for changing individual's teaching, thinking, and learning (Halverson & Smith, 2009). In their longitudinal study, Gosper et al. (2014) found that there has been an increase in the use of most technologies for learning Since 2010. According to Alsaadat (2009), m-learning is considered as an important factor in getting young adults to engage more in learning. However, Guri-Rosenblit (2005) has concluded that the human capacity to respond and adapt to the pace of new technologies is now slower and more limited, therefore educators using tablets in the classroom need to know how to instruct students in using these devices effectively (Rossing et al., 2012).

Hocann and Iscioglu (2014) determined that students consider the benefits of using tablets to be the enrichment of lessons in terms of material. However, they also recognise that using tablets for learning can be distracting and cause health problems such as headache and poor eyesight. Overall, however, the authors found that students were generally positive about using tablets in education (Hocanın & Iscioglu, 2014). During observation of a science class (Goundar, 2011), students said that they preferred using a tablet to a laptop because of the tablet's lightweight, mobility, touch screen, and apps. They used tablets to read free open source textbook, research through interactive apps, access the school's e-learning platform and write lab reports. The researcher concluded that tablets were specifically helpful for laboratory work as the students were able to carry them around (Goundar, 2011).

Although adopting tablet use in the classroom clearly has advantages, it is also unfortunately true that students can simply play with applications during class time instead of using the technology as a powerful tool in the learning process (Schnackenberg, 2013). Thus, the key to the successful and effective adoption of tablets in classrooms is to ensure that tablets are integrated into academic activities such as viewing and taking lecture notes, reading textbooks and articles, conducting research, and completing electronic assessments and also into the social aspects of education, such as enhancing interaction and collaboration between the students (Fischer et al., 2013; Mang & Wardley, 2012) although this requires good self-regulation and filtering skills.

The use of tablets in classrooms requires a new pedagogy (Rikala et al., 2013). Teachers need to know about more suitable ways to integrate the use of tablets into the classrooms in a way that connects the classroom with the outside world. Further claim that more researches are needed to design appropriate guidelines for new curriculum and pedagogy to support and assess the use of tablets in classrooms (Clarke & Svanaes, 2014). Therefore, pedagogy needs to be changed to more suit tablet use in classrooms (Shamir-Inbal & Blau, 2016).

2.4.6 Tablets in Higher Education

There has been a remarkable change in education recently, particularly in higher education (Liaw & Huang, 2011). Although numerous universities have already designed software to be used with tablets, along with best practice guidelines for educators and students (Johnson et al., 2013), tablets have made their way into universities slowly (Schnackenberg, 2013). Those universities which encourage tablet use try to catch up with technological innovation and then work on the educational use of tablets. Some universities use their own branded tablet app that includes features like campus maps, access to grades, university news, and more (Johnson et al., 2013; Mohseni, 2014). However, it would also be useful if an iTunes catalogue (or similar) were incorporated into the app to make it easy to download video lectures and other course materials on-the-go. Though, for some universities, especially those with large student numbers or who have limited budget, it would not be practical to provide each student with a tablet (Rossing et al., 2012).

Tablets can facilitate and enhance teaching and learning in the context of higher education (Fischer et al., 2013; Mohseni, 2014). On the other hand, many academics in higher education do not use newer technologies for learning and teaching (Johnson et al., 2013) due to many factors such as lack of time or negative attitudes. Thus, in order to adopt any kind of technology, attitudinal change among teaching staff is essential.

Although tablets have become a very common tool (Kothaneth et al., 2012) for students in higher education (Mang & Wardley, 2012), adopting technology for technology's sake does not guarantee better learning outcomes or enriched educational experiences, and the benefits are not always clear (Fischer et al., 2013). On the other hand, the outcomes of m-learning suggest that it does have a direct influence on student learning (Moran et al., 2010).

Opinions differ as to the availability of studies of tablet technology in higher education. According to Mang and Wardley (2012), many studies have been conducted on the use of laptop computers in higher education but not on the integration of tablet technology, since tablets have only recently become widely available. According to Butcher (2014), there are limited research studies of the benefits of tablet use which have been reported in higher education (HE). However, taking a view

to the contrary, Schnackenberg asserts that many studies of tablet use have been conducted in the HE context (Schnackenberg, 2013). For example, in a study by Fagen & Kamin (2013) it was concluded that students used tablets more when they were programming computer code during class discussions. Romney (2011) conducted a longitudinal study and discovered that undergraduate students who used tablets in learning were more likely to continue their studies than were their non-tablet user friends. El-Gayar et al. (2011) have found that tablet computer use in higher education is very effective. Mang and Wardley (2013) found that most students chose to study with tablets rather than laptops and held positive attitudes toward using tablets in learning and only a few students continued to use laptops. Students in this study believed that tablets are less distracting than laptop as they display only one app at a time. In a study by Eichenlaub et al. as cited in Mang and Wardley (2012), it was found that among students using tablets at Ryerson University, there was increased collaboration and improvement in organisational and research skills. Moreover, Weider (2011) reported that tablet use improved student-to-student collaboration among students at Pepperdine University, where students were able to work with each other and share screen images while solving problems.

What is clear from tablet computer research is that the adoption of tablets in HE is not guaranteed to be successful (Mang & Wardley, 2012). Hence, few universities adopt them (Fischer et al., 2013; Moran et al., 2010) because the faculty as well as the students must be persuaded to adopt the device. It must be remembered that staff and students may not necessarily be inclined to use tablets in teaching and learning, and that even students have to be motivated for sustained interaction with tablets. Nevertheless, if tablet use is integrated well, there will be an increase in the positive outcomes of tablet use (Mohseni, 2014).

2.4.7 Tablets in KSA

To the best of the researcher's knowledge, there are very few studies dealing with the use of tablets in education in KSA. However, it is estimated that around 50% of Saudi students own a personal or family tablet computer (Alahmad, 2014). A study by Alqhtani et al. (2013) explored how tablet computers could transform the KSA education system. Unfortunately, their research showed that tablet use was at that time still very limited among students despite evidence of positive learning outcomes as a result of their use.

2.4.8 Summary

Researchers agree that the tablet is a useful tool for educational purposes and that it can be used very effectively to facilitate student learning and interaction. Thus, the tablet may well become the

main device used in learning and classroom environments in the near future, although studies show that the adoption of tablets in HE is not guaranteed to be successful. Tablets such as iPads support access to many kinds of information and possess advantages for collaborative learning. However, these devices could also distract students and create frustration in the classroom. On the other hand, if tablets are incorporated into the classroom carefully and reflectively, educators can maximise their potential to enhance learning and minimise obstacles with learning.

Nowadays, the question is not whether or not we should use technology in classrooms, but rather how should we use it. However, as tablet is a more recent innovation, it is necessary to study whether or not as well as how we should use tablets for learning in the classroom.

Investigating learners' acceptance of m-learning is important (Liaw & Huang, 2011). Acceptance of technology to support student learning is premised by professed beliefs which lead to intentions, and these will be followed by planned behaviour (Moran et al., 2010). Thus, in order to know whether students accept or reject the use of tablets in their learning and the factors that influence students to adopt the use of tablets, suitable technology acceptance models are considered in this study. The following section reviews models and theories of technology acceptance.

2.5 The Theoretical Underpinning

In this research, two theories have been integrated to develop the proposed model. One is a technology acceptance model and the other is a motivational model.

2.5.1 Technology Acceptance Models and Theories

2.5.1.1 Introduction

Interaction between humans and technology is influenced by a number of social and psychological factors and characteristics (Taiwo & Downe, 2013). Because of the complexities involved in predicting human behaviour, research has generated a variety of theories and models to explain patterns of adoption and use of new technologies (Alomary & Woollard, 2015). Technology acceptance research is a mature field and has now been active for two decades as technology has permeated every domain of life. However, there is ample scope for research in this area in the field of education. The design, development and acceptance of information and communication technology (ICT) has become a recognised field of study in the past few decades (Taiwo & Downe, 2013) and several theoretical models have been developed to explain the acceptance behaviour of end users. Therefore, the study of technological innovation acceptance is important (Liaw & Huang, 2012) and requires psychological models and theories to explain and rationalise whether users

benefit from new devices. Several technology acceptance models have been developed, and they have their own specific characteristics and advantages which are reviewed below. The models are presented in chronological order.

2.5.1.2 Theory of Reasoned Action (TRA) (1975)

The theory of reasoned action was first introduced by Ajzen and Fishbein in 1975 and further developed in 1980. It is designed to explain virtually any kind of individual behaviour (Ajzen & Fishbein, 1980; Davis et al., 1989; Fishbein & Ajzen, 1975). It can be considered as a technology acceptance model when it is used to predict the behaviour of human beings who are exposed to a new technology. According to this model, the individual's attitude towards a given situation combines with subjective norms to shape the behaviour intention, which in turn influences the individual's actual behaviour (Figure 2).

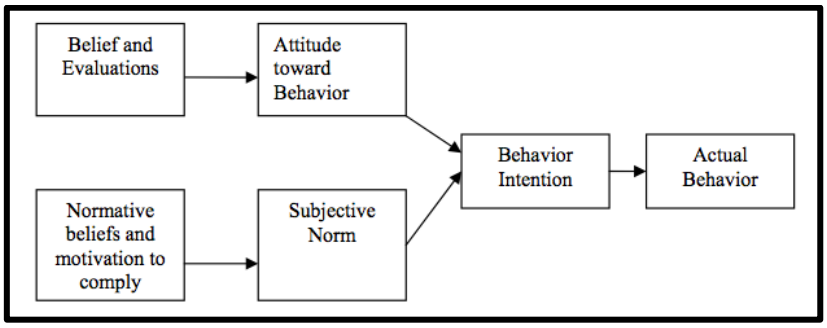

Figure 2 Theory of reasoned action (TRA) (Ajzen & Fishbein, 1980)

According to this model, behaviour intention refers to the intention of the individual to perform a certain task, attitude refers to the positive or negative feelings associated with performing the task, and subjective norm refers to how people who are important to this individual will perceive them when they perform the task. Researchers of ICT have suggested intention models from social psychology as a potential theoretical foundation for research on the factors of user behaviour (Davis et al., 1989). One of these intention models is TRA, which is considered to be well-researched and has proven successful in explaining and predicting the behaviour across different domains. The TRA is a very general model but it has acted as a starting point for several other technology acceptance models (Davis et al., 1989). It links the perceptions, norms, and attitudes toward behavioural intentions of a person in making a decision, and from there predicts the actual behaviour which may result as a consequence of this intention. The model has been criticised, however, because it does not consider the individual's ability to control the behaviour (Yusuf & Derus, 2013).

2.5.1.3 Technology Acceptance Model (TAM) (1986, 1989)

Fred Davis developed the TAM first in 1986 in his doctoral study (Davis et al., 1989). The TAM originated as an adaptation of the more generalised TRA and was developed more specifically later to predict and explain technology usage behaviour (Davis et al., 1989; Davis, 1989). TAM is "helpful not only for prediction but also for explanation". (Davis et al., 1989:985). Therefore, it is a very helpful model for researchers since it can be used not only for prediction but also for explanation. The TAM was developed by Davis in 1989 to identify the factors which lead users to accept or reject a technology by integrating the technological aspects and the organisational behaviour concepts (Davis et al., 1989; Davis, 1989). According to them, practitioners assess systems for two reasons. Firstly, to predict acceptability and secondly to identify the reasons resulting in lack of acceptance and to take appropriate measures to improve user acceptance. This model has been used successfully by groups of researchers in diverse fields including knowledge management, e-learning, ICT, mobile learning and in healthcare settings, and with a variety of technologies (Chau & Hu, 2002; Gao, 2005; Huang et al., 2007; Liang et al., 2003; McKinnon & Igonor, 2008; Park, 2009; Sugar et al., 2004; Teo, 2009). For example, Park used TAM to research attitudes to e-learning among university students in his study which carried out in 2009 (Park, 2009).

According to this model, while there are several factors affecting users' acceptance of a technology, the two most important are perceived usefulness and perceived ease of use (Davis, 1989). Perceived usefulness refers to the improvement that can be expected in task performance with the aid of the technology, and perceived ease of use refers to the perceived easiness of using the new technology (Davis et al., 1989). Shroff et al. (2011) reported that by manipulating these two determinants, system developers can have better control over users' beliefs about the system and so can predict their behavioural intention and actual usage of the system. Liu (2009) noted that participants' perception of technology was the biggest factor in predicting their attitudes towards it. Attitude towards using a new system has been classified as a determinant that guides future behaviour or as an indicator of intention which eventually leads to certain behaviour (Afshari et al., 2013; Elias et al., 2012; Teo, 2006). However, Teo and Schalk (2009) found that attitude towards using computers did not have a significant effect on the intention to use. Thus, Baker (1992) argued for the importance of attitude as an indicator of a user's thoughts. Studies have supported the notion that behavioural intentions are found to have a positive influence on actual behaviour (Davis et al.,1989; Fishbein & Ajzen, 1975; Khechine et al., 2014; Leng et al., 2011). In TAM, attitude towards using a system refers to the evaluative effect of positive or negative feelings of individuals in performing a certain behaviour (Shroff et al., 2011). So, the TAM has used the TRA as a theoretical basis to find the links between these two factors as well as the user's attitude, intention and actual technology behaviour (Figure 3).

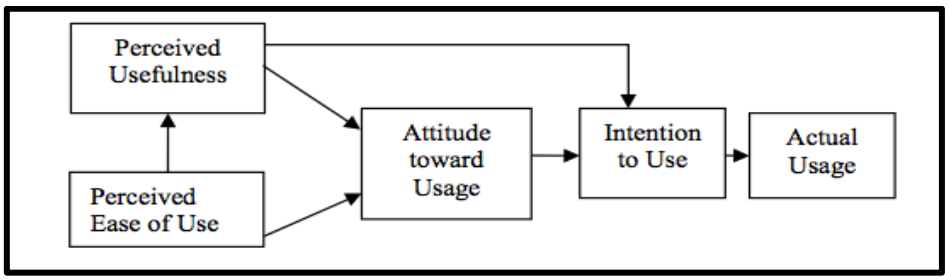

Figure 3 Technology acceptance model (TAM) (Davis et al., 1989)

It can be noticed from this model that perceived usefulness has a direct effect on the intention to use (Davis et al., 1989). For example, someone may hate using a computer at work, but does so in order to gain promotion and a higher salary. Here, the negative attitude of the user is overridden by the desire for promotion or higher salary. It has been found that perceived usefulness is the strongest predictor of intention to use an ICT (Venkatesh & Bala, 2008). In contrast with TRA, the TAM does not include subjective norms because of the weak psychometric results which are generated (Davis et al., 1989; Wu et al., 2011). Researchers of ICT have criticised this model for not including subjective norms, however, as this is considered to be a crucial factor, despite that the inclusion of subjective norms in TRA is known to have theoretical and psychometric issues (Galletta, 1999).

According to Davis (1989), technology acceptance is a crucial factor in determining the success or failure of a computer system project. He also suggested that further studies are needed to extend the TAM to determine the types of external variables, such as computer self-efficacy and training that could influence the motivation belief factors of perceived usefulness and perceived ease of use. The assumption of the TAM is that the 'perception-attitude-intention-behaviour' relationship predicts the acceptance of a technology (Davis et al., 1989). But this assumption is contested by several researchers, among which Bagozzi et al., (2003) claim that in a real world situation there are many constraints which limit people's freedom to act, such as limited ability, time constraints, environmental or organisational limits, or unconscious habits. Some researchers argue that the TAM does not consider any barriers that would prevent the individual from adopting a particular technology (Taylor & Todd, 2001). According to them, systems design characteristics, training, support, and decision making characteristics can influence the acceptance of a technology, and these are not considered in the TAM. Also, Bagozzi is of the opinion that the TAM is too simple and leaves out important variables (Bagozzi, 2007).

On the other hand, it has also been recognised by others as a powerful, valid and highly reliable predictive model that can be used in several contexts (Legris et al., 2003; Sharma & Chandel, 2013). Moreover, it constitutes an important theoretical contribution towards understanding ICT usage

and acceptance behaviours (Chen & Li, 2011; Galletta, 1999). Therefore, with regard to the ICT field, researchers have used the TAM to study the adoption of different technologies and it has become the most significant theory in this field. The TAM is more appropriate in an online context than the TRA and the theory of planned behaviour (TPB), as it has some advantages in this area (Chen & Li, 2011). Firstly, the TAM is specific to ICT usage in applying the concepts of ease of use and usefulness. Secondly, it is more economical. Thirdly, it is more robust in various ICT applications. Dillon and Morris (1998), as cited in Shroff et al. (2011), defined technology acceptance as the demonstrable willingness within a user group to employ ICT for the tasks it was designed to support.

2.5.1.4 Motivation Model (MM) (1992)

The motivation model has been applied by Davis et al. to study ICT adoption and use (1992). It posits that the individual's behaviour is based on intrinsic and extrinsic motivation. Intrinsic motivation arises from a person's inner drive to perform the task and relates to perceptions of pleasure and satisfaction (Davis et al., 1992; Vallerand, 1997). On the other hand, extrinsic motivation arises when the cause of motivation is outside the person or outside the task (Cheng & Yeh, 2009). Extrinsic motivation can be defined as the drive to perform an activity because it is perceived to be instrumental in achieving valued outcomes such as improved job performance, pay, or promotions (Davis et al., 1992). In other words, intrinsic motivation is the driver when an individual performs an activity for its own sake whereas extrinsic motivation is at work when an individual performs an activity to gain external rewards. In this model, enjoyment is determinant of intrinsic motivation (Davis et al., 1992; Venkatesh, 2000) and perceived usefulness is determinant of extrinsic motivation.

This model is based on the psychological aspects of technology acceptance. Typically it accounts for the social influences on technology acceptance. Vallerand (1997) introduced the additional motivation component to the TAM. According to this model, users want to perform an activity because a 'value outcome' is associated with it, which could be in the form of enhanced job performance, reward, recognition or other form of extrinsic factors. Thus, according to this model the decision to adopt the new technology will be a function of intrinsic and/or extrinsic motivators. However, Howard et al. (2010) argued Davies views of perceived usefulness as an example of extrinsic motivation, while enjoyment is an example of intrinsic motivation. However, these two examples of intrinsic and extrinsic motivation have continued to be used widely in technology acceptance and adoption research (Bertrand & Bouchard, 2008; Yoo et al., 2012). MM underlines that TAM's example of intrinsic motivation is more associated with emotions rather than the actual underlying motivations themselves (Howard et al., 2010).

2.5.1.5 Combined TAM – TPB (1995)

This model was developed by Taylor and Todd in 1995 by linking the predictors of theory of planned behaviour (TPB) with the constructs of perceived usefulness and ease of use from TAM (Surendran, 2012; Taylor & Todd, 1995). It is also known as the 'decomposed' theory of planned behaviour because the belief structure is decomposed in this model (Lau, 2011). Attitude is thus decomposed to be affected by relative advantage, complexity and compatibility. The subjective norms structure is affected by peer influence and superior influence. The control belief structure is affected by self-efficacy and facilitating conditions (Figure 4).

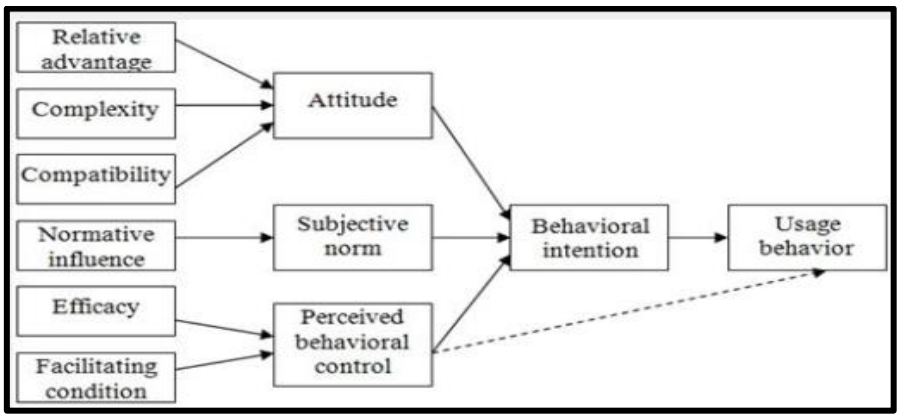

Figure 4 Combined TAM – TPB (Lau, 2011)

2.5.1.6 Extension of TAM (TAM2) (2000)

The limitations of the TAM have prompted deeper research in the field and attempts have been made to add 'user resources' and 'restrictions' to the model (Mathieson et al., 2001). This has led to the development and extension of the TAM.

Venkatesh & Davis (2000) added two more determinants to the original TAM: social influences and cognitive instrumental processes. The social influences include subjective norms and images. Subjective norms refer to how a person perceives what people important to him/her may think about their actions. Image refers to the status issues relating to a particular piece of technology. Blader & Tyler (2009) stated that social influence is an important determinant of behaviour in organisational settings because it provides a critical pathway through which other workplace factors affect behaviour. Moreover, sense of belonging to group can predict behaviour in a workplace (Chan, 2011; Damásio et al., 2012; Ernst et al., 2013).

On the other hand, the cognitive instrumental processes include job relevance, output quality, result demonstrability and perceived ease of use. TAM2 keeps the concept of perceived ease of use from the original TAM as a direct determinant of perceived usefulness. Job relevance refers to an

individual's perception of the degree to which the target system is appropriate to his or her job. Output quality indicates an individual's perception regarding how well the system performs the tasks. Result demonstrability refers to the tangibility of the results of using the innovation. All of these additional elements are believed to influence the acceptance of technology. There are two moderating variables in this model, which are experience and voluntariness. Experience refers to the changes which may occur based on the experience with the newer technology. Voluntariness refers to mandatory and non-mandatory usage, which influences the intentions. Thus, Venkatesh and Davis (2000) proposed this model as an extension of TAM, to include social influence processes and cognitive processes (Figure 5). Experience acts as a moderating variable between subjective norm and perceived usefulness, whereas experience and voluntariness act as the moderating variables between subjective norm and intention to use. In the TRA and TAM models, attitude is a determinant of behavioural intention. However, in TAM2, the variable of attitude has been removed (Wu et al., 2011). Davis has argued that in the original TAM, the influence of subjective norms on behavioural intention to use can be ignored and so subjective norms were not considered. Nevertheless, in the extension of TAM, TAM2, Venkatesh & Davis (2000) have reconsidered subjective norms.

As conceptualised in this model, the five external factors of subjective norm, image, job relevance, output quality, result demonstrability and perceived ease of use influence an individual's perceived usefulness of the new technology along with the perceived ease of use. Both the perceived usefulness and perceived ease of use influence the intention to use, which in turn influences usage behaviour as in the original TAM. But the special feature of the extension of TAM is that the experience and voluntariness of the user also act as moderating variables (Bagozzi et al., 2003; Raaij & Schepers, 2008; Wu et al., 2011) (Figure 5).

TAM2 was tested in both voluntary and mandatory contexts (Park, 2009). It posits that in mandatory contexts, subjective norm has a direct influence on intention via the mechanism of compliance. Compliance refers to a situation in which an individual acts in order to attain special rewards or avoid punishment (Miniard & Cohen, 1979). On the other hand, in voluntary contexts, social influences can affect intention indirectly via the mechanism of internalisation and identification. Internalisation is defined as the process whereby an individual combines the important referent's belief into his or her own belief structure. Identification refers to an individual's belief that a particular way of behaving will confer membership of a social group or achieve a higher status within the group by virtue of the approval of important referents (Venkatesh & Bala, 2008).

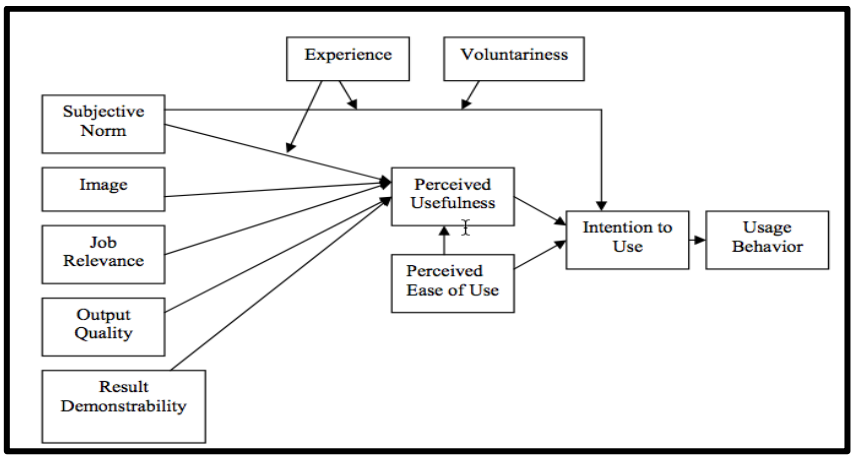

Figure 5 Extension of TAM (TAM2) (Venkatesh & Davis, 2000)

2.5.1.7 Unified Theory of Acceptance and Use of Technology (UTAUT) (2003)

Combining the various theories and models of technology acceptance, Venkatesh et al. (2003) developed a unification theory in which they integrated the components of several technology acceptance models and theories such as TRA, TAM, the motivational model, TPB, combined TAM-TPB and TAM2 (Anderson & Schwager, 2003; Venkatesh et al., 2012). They empirically validated the model with six longitudinal field studies of six different departments of six large firms in six different industries (Anderson & Schwager, 2003; Taiwo & Downe, 2013).

However, although the explanation of UTAUT is a well-meaning and thoughtful presentation, it has been criticised for having too many independent variables for predicting intentions and behaviour (Bagozzi, 2007). The model is considered to be more robust than other technology acceptance models in evaluating and predicting technology acceptance (Venkatesh et al., 2003). However, although the model has been much used, tested and validated, the results of empirical studies have been unsatisfying in respect of the magnitude, direction and significance of the relationships within it (Taiwo & Downe, 2013). We can say in social sciences research that the issue of difference in statistical significance is common because of the complexity of human behaviour (Taiwo & Downe, 2013).

Each theory or model has been widely tested to predict user acceptance (Venkatesh & Davis, 2000). However, no comprehensive instrument to measure the different perceptions of ICT innovations had existed until Venkatesh et al. reviewed and compared current user acceptance models and then found a way to unite them (2003). The unified theory of technology acceptance has been developed by combining every major parallel aspect of user acceptance determinants from these models.

The UTAUT model used four main determinants of usage and intention; these are performance expectancy, effort expectancy, social influence, and facilitating conditions. These stand alongside four moderators of gender, age, experience and voluntariness of use.

Performance expectancy refers to the degree to which a user believes that a particular technology will improve his or her job performance. Effort expectancy refers to the degree of simplicity associated with the use of a certain system. Social influence refers to the degree to which the users believe that people who are important to them feel that they should use the new technology. Facilitating conditions refers to the degree to which a user believes that an organisational and technical infrastructure exists to support the use of a certain system (Figure 6). According to Pajo and Wallace (2001), the conditions which facilitate the implementation of web-based teaching are technical and organisational support, personal knowledge, hardware, software and instructional design.

Performance expectancy in this model equates to perceived usefulness, effort expectancy is the same as perceived ease of use, and social influence equates to subjective norms. The moderating variables in this theory are gender, age, experience, and voluntariness. Gender is considered to have psychological influence. Age has attitude related effects. Experience is related to the effort exerted to learn the new technology. Voluntariness decides whether the use is mandatory or if the user is self-motivated (Venkatesh et al., 2003).

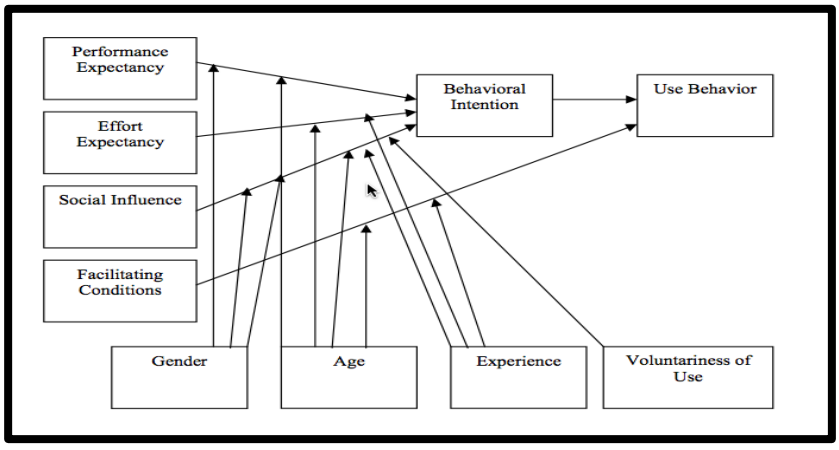

Figure 6 Unified theory of acceptance and use of technology (UTAUT) (Venkatesh et al., 2003)

2.5.1.8 Technology Acceptance Model (TAM3) (2008)

The third version of the technology acceptance model (TAM3) was developed by Venkatesh and Bala in 2008 to give a higher level of significance to 'perceived ease of use' (Venkatesh & Bala,

2008). They added the dimensions of computer self-efficacy, perception of external control, computer anxiety and computer playfulness. Computer self-efficacy refers to an individual's beliefs about their ability to perform tasks on the computer using the technology in question. Several studies found that computer self-efficacy is an important factor in a user's decision to use computer technology (Black & Lynch., 2001; Compeau & Higgins, 1995; Hill et al., 1987; Lopez & Manson, 1997; Teo, 2009; Zimmerman, 2000). Perception of external control refers to how the individual perceives organisational and technological integration in the context of the new technology. Computer anxiety refers to the fear factor associated with the acclimatisation to newer technology. Computer playfulness is the inner desire of an individual to experiment with the newer technology. Two adjustment variables have also been added, which are perceived enjoyment and objective usability. Perceived enjoyment refers to the extent to which using a certain system is perceived to be enjoyable in its own right, and objective usability refers to a comparison of systems based on the actual level (rather than perceptions) of effort required to complete certain tasks Figure 7.

TAM3 is constructed on a theoretical framework of four classifications which Venkatesh and Bala claim is a synthesis of all prior TAM research (2008). These four classifications are individual differences, system characteristics, social influence and facilitating conditions (Howard et al., 2010). Individual differences stand for computer self-efficacy, computer anxiety and computer playfulness. System characteristics include job relevance, output quality, result demonstrability, perceived enjoyment and objective usability. Social influence stands for subjective norms and image, and facilitating conditions are the user's perception of external control.

Venkatesh & Bala (2008) reported that "TAM3 presents a complete nomological network of the determinants of individuals' ICT adoption and use… The key strength of TAM3 is its comprehensiveness and potential for actionable guidance" (2008:279). In TAM3, the factor of perceived ease of use is characterised by several attributes and emotions, such as computer self-efficacy, computer playfulness, and computer anxiety (Figure 7). The authors believed that the factor of perceived ease of use does not have an effect on perceived usefulness. According to this model, the perceived ease of use is determined by computer self-efficacy, computer playfulness, computer anxiety, perception of external control, perceived enjoyment and objective usability. The perceived usefulness is determined by subjective norms, job relevance, result demonstrability and image. This model has demonstrated that none of the determinants of perceived ease of use have significant effects on perceived usefulness and vice versa. In TAM3, the strongest predictor of behavioural intention is perceived usefulness, as was concluded in the original TAM. TAM3 also claims that experience moderates the effect of perceived ease of use on behavioural intention and perceived usefulness. This model is clearly consistent with previous studies on ICT adoption and social psychology, as it has been found that behavioural intention is a significant predictor of actual

use. However, one of the criticisms of the model is that there are too many variables and too many relationships between the variables (Howard et al., 2010).

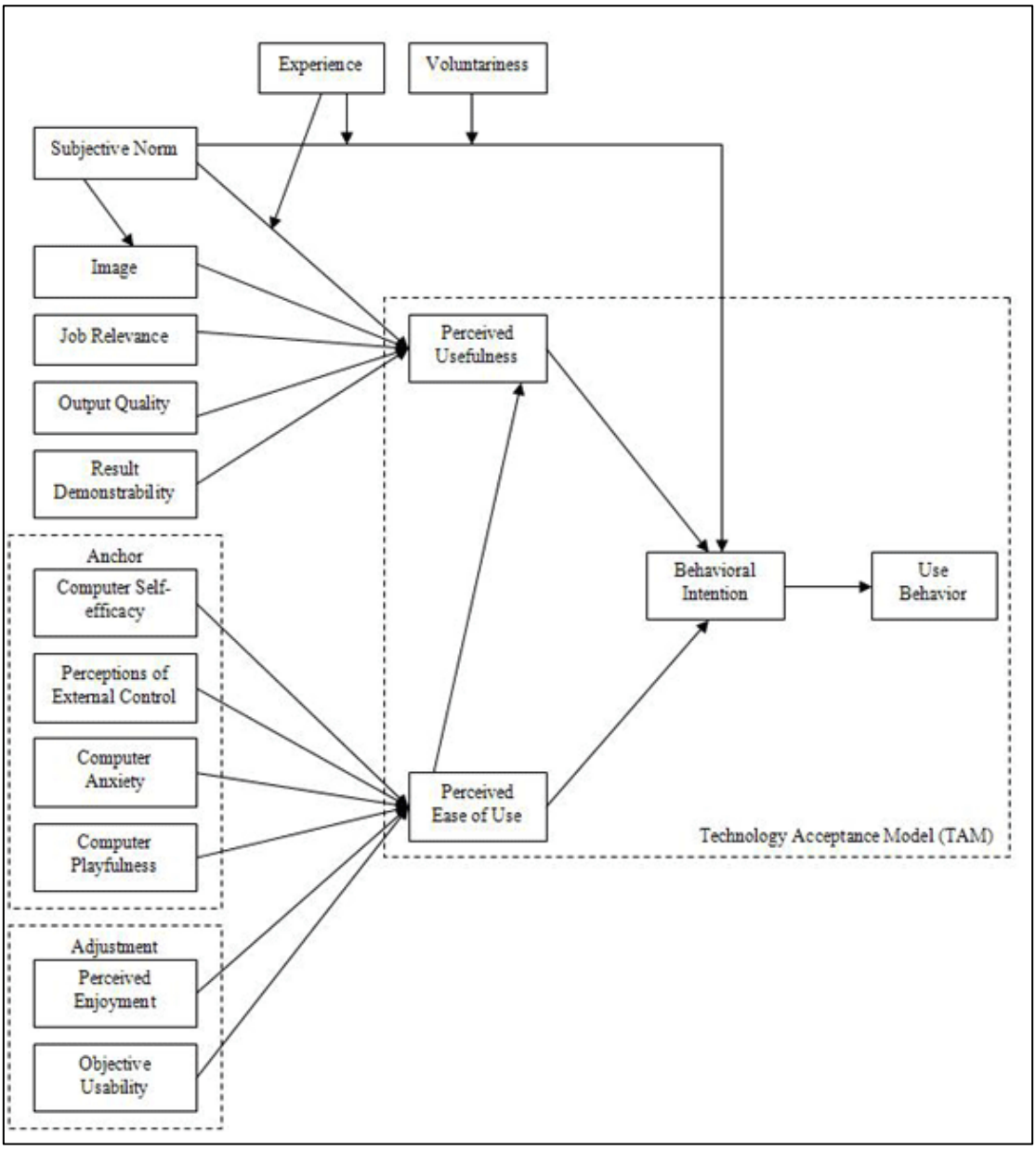

Figure 7 Technology acceptance model 3 (TAM3) (Venkatesh & Bala, 2008)

2.5.1.9 Extending Unified Theory of Acceptance and Use of Technology (UTAUT2) (2012)

The extension of the unified theory of acceptance and use of technology has been developed by Venkatesh et al. (2012) to pay particular attention to the consumer use context. There are three general types of UTAUT extensions or integrations, firstly to examine UTAUT in new contexts or kinds of technology, secondly to account for new user populations and new cultural settings, and thirdly, to add new constructs to expand the scope of the endogenous theoretical mechanisms proposed in the UTAUT (Venkatesh et al., 2012). So these extensive applications and

extensions/integrations of UTAUT have been valuable in developing our understanding of technology adoption and extending the theoretical boundaries of the theory. These studies contribute to understanding the utility of UTAUT in various contexts, as the authors felt that there was still a need to investigate systematically and theorize the salient factors that apply to consumer technology use.

This model included the independent variables of UTAUT but added three more which are hedonic motivation, price value and habit (Venkatesh et al., 2012) (Figure 8). Hedonic motivation refers to the fun or pleasure derived from using a technology, and it has been shown to play an important role in determining technology acceptance and use. The UTAUT takes an approach that emphasises the importance of performance expectancy, which has consistently been shown to be the strongest predictor of behavioural intention (Venkatesh et al., 2003). In this theory, hedonic motivation has also proved to be a strong predictor of behavioural intention. Price value refers to the consumers' cognitive trade-off between the perceived benefits of the applications and the monetary cost of using them. Habit refers to the extent to which individuals tend to perform behaviours automatically because of learning. They have integrated these three independent variables into UTAUT in order to tailor it to the consumer technology use context. Moreover, by combining these three salient constructs into UTAUT, Venkatesh et al. expand the overall nomological network with regard to technology use. This theory includes age, gender and experience as moderating variables; however, voluntariness has been ignored.

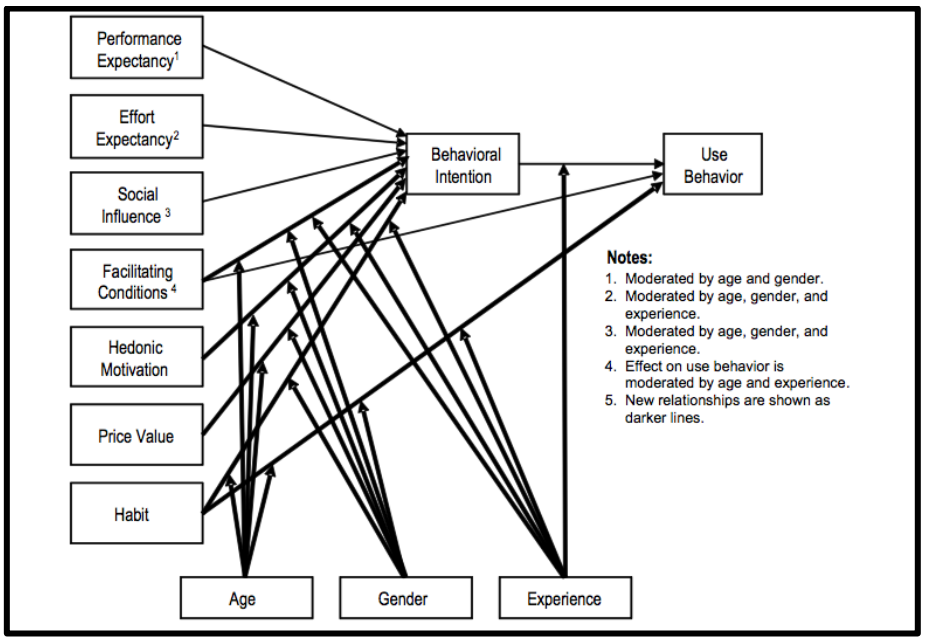

Figure 8 Extending unified theory of acceptance and use of technology (UTAUT2) (Venkatesh et al., 2012)

The models of technology acceptance may be grouped as shown in Appendix A Table 20. It can be shown that the technology acceptance models are multidimensional in nature as well as multidisciplinary. Construction of a general model considering all the factors to test technology acceptance would be complex and some of the factors have been named differently based on the context of application.

2.5.1.10 TAM in Education

While many universities across the world have integrated technology-based learning systems, the success of their implementation requires an extensive understanding of the end user acceptance process (Adwan et al., 2013). Learning using technology has become a common approach within higher education institutions because of the continuous growth of technological innovations. Technology acceptance can be defined as user willingness to employ technology for the tasks it is designed to support. Over the years, acceptance researchers have become more interested in understanding the factors influencing the adoption of technologies in various settings. In recent years, TAM research has been reported with increasing frequency in education related journal and this is an indication of its growing importance in educational research (Teo, 2011). Over more than two decades the extensions and refinements of TAM have broadened out in several directions to encompass groupware, e-commerce, knowledge management, and educational technology (Teo, 2011). TAM studies in educational settings, such as Gao (2004) and Ma and Yuen (2011), investigate various issues in this domain.

The potential of technology for enhancing education is instinctively compelling. Nevertheless, opinions about the value of technology for teaching and learning range from blue sky optimism to more doubtful views that educational technology may be wasteful or even harmful (Teo, 2011). It is time to move beyond simplistic debates about whether or not technology has anything to offer education towards establishing a base of scientific knowledge about how to get the best out of educational technology. The success of educational technology depends on whether it truly delivers value, is perceived as doing so, and is adopted and used (Teo, 2011).

When students enrol in universities, a new world opens up; a world in which they have to draw on their prior knowledge and skills acquired during secondary education. The amount of background knowledge which students can rely on depends on the correspondence between their branch of study during secondary education and their subject at university (Orji, 2010; Pynoo et al., 2011). In this case, students' proficiency relies not only on their prior education, but also on their motivation to use a technology for academic tasks and thus they have to acquire these skills on their own (Pynoo et al., 2011). Thus, students' perceptions about m-learning need to be explored and

examined before implementing m-learning in higher education (Abu-Al-Aish & Love, 2013).

A study by Smarkola (2011) investigated student teachers' and experienced teachers' computer usage in classrooms, examining the efficacy of the TAM and decomposed TPB for predicting computer usage intention. The conclusion was that although the TAM was a good predictor of intentions, the decomposed TPB emerged as the most important model for better understanding and predicting teachers' computer usage intentions. The following four themes emerged from the interview used in Smarkola's study. First, the value of computers in teaching and learning; second, creating ways of learning through the internet; third, computer training in the first year of teaching; and fourth, high personal computer confidence. One small scale exploratory study investigated why digital technologies are adopted by university students in their everyday and academic lives (Bennett et al., 2011). It was found that the participants all used computer technology for communication and accessing information and that they considered ease of use to be an important factor. The study also suggested that not only are individual differences in technology use to be expected, but also that perceptions and use of technologies in diverse contexts are likely to vary.

Many studies have investigated the difference between males' and females' attitude towards technology. Some concluded that there is a difference (Okazaki & Santos, 2012; Islam et al., 2011; Mazman & Usluel, 2011) while others found no significant difference between them (Rhema & Miliszewska, 2014; Suri & Sharma, 2013; Yau & Leung, 2016; Venkatesh et al., 2012). A possible explanation for the difference between the gender attitudes towards technology might be that males and females have similar amount of experience. For example, Chen (1985) highlighted that females and males responded with similar levels of interest toward computers when they had equal amounts of computer experience. Moreover, Kirkpatrick and Cuban (1998) found that the gender gap was narrowed when both genders had similar amounts of experiences when using computers. When it comes to the tablet use in higher education, Yau and Leung (2016) found that there is no significant difference between male and female students in higher education regarding their attitude and use of tablets in learning.

2.5.1.11 TAM in Developing Countries

Higher education institutions in developed Western countries believe that technological innovation and development offer rich opportunities to enhance learning (Adwan et al., 2013). This places developing countries, striving to be equally competitive in international markets, under great pressure to similarly embed suitable technologies within the learning and curriculum approaches, and accordingly enhance learning experiences. This section gives examples of studies involving the TAM in a number of developing counties. In 2005, few studies were carried out to test the

applicability of the TAM outside North America (Averweg, 2005). However, since 2005, technology acceptance has been increasingly studied worldwide.

One empirical study focusing on Malaysian student teachers' acceptance of computer technology in a leading research university used the TAM as a theoretical model (Wong et al., 2013). It showed that the TAM posits that the most frequent determinant of an individual's behaviour is behavioural intention to perform a certain task. Another study provided further validation for a TAM model among university faculty members in Jordan (Akour & Dwairi, 2012). The findings showed that the user's attitudes and behaviour towards computer technology are consistent predictors of technology acceptance. However, organisational support factors (end user support and administrative support) are not completely stable determinants of technology acceptance. Thus, the nature of the correlations between organisational supports, beliefs and behaviour, and computer technology usage may be more complex than previously believed because of variations in cultural dimensions within countries (Akour & Dwairi, 2012). Moreover, a study conducted in the Lebanese e-learning context, revealed perceived usefulness, perceived ease of use, social norms and quality of work life to be significant determinants of students' behavioural intention, thus empirically validating an extended technology acceptance model (Tarhini et al., 2013). Another study examining the computer usage intentions of Ghanaian tertiary students (Afari-Kumah & Achampong, 2010) indicated that both perceived usefulness and perceived ease of use had a significant influence on the students' attitude towards their computer usage.

Further research has focused on the investigation of students' adoption of e-learning systems based on the TAM at Jordanian universities (Adwan et al., 2013). This work shows that the TAM can be employed as a useful theoretical base to predict and understand users' intentions to use e-learning. It also confirms that in order to motivate students' intentions to use technology in their learning environment, it is important to present a positive perception of technology usefulness (Adwan et al., 2013).

There is evidence to show a difference between universities in developing and developed countries (Hussein et al., 2007). In the case of the Indonesian Open University, instructional design, technological factors and computer self-efficacy were found to play an essential role in facilitating learners' acceptance of e-learning, while this was not in the case in the developed country studied. Consequently, in order to improve their e-learning initiatives, developing countries should focus more on improving their technological infrastructures such as accessibility and connectivity (Hussein et al., 2007).

Saudi Arabia is an important developing country in the Arab world (Averweg, 2005). Findings by

Alqahtani et al., (2014) showed that TAM constructs are both valid and reliable, and that the TAM can effectively predict and explain the adoption and use of computer technology. The TAM has also been successfully applied in Malaysia (Suradi, 2001). However, in Africa, the situation seems to be different, as Averweg (2005) found no direct evidence to support the applicability of the TAM's determinants of usage. In a study of 3G use, social influence and price perception were included as variables in an extended TAM model involving students at the University of Botswana in Africa (Garg & Garg, 2013). The results of the study did not confirm a direct relationship between social influence and behavioural intention. Perceptions of price were found to influence perceptions of the usefulness of 3G. This study confirms that the price of such services will affect perceptions of usefulness, and this finding should serve as a guiding mechanism for operators in African and other developing markets (Garg & Garg, 2013).

A study of ICT adoption in an Iranian organisation (Arias-Aranda & Benitez-Amado, 2011) found that ICT adoption success is affected by users' (both CEO and staff) ICT knowledge and involvement, CEO support and external assistance. In addition, the TAM was used to explain the effects of e-commerce adoption in Malaysia regarding the overall use of the Web for online shopping (Md et al., 2011). The findings indicated that the TAM offers valuable constructs (perceived usefulness, perceived ease of use, and perceived enjoyment) to explain the effect of e-commerce adoption. In addition, a study conducted in the healthcare system in a developing country investigated patients' perceptions and acceptance of systems based on an extended TAM for assessing factors that contribute to health information technology acceptance (Ahlan & Ahmad, 2015). To conclude, the relatively small amount of literature on technology acceptance and the TAM in developing countries suggests that more research is needed (Akour & Dwairi, 2012).

2.5.1.12 TAM in Mobile Learning Context

Recent diffusion of mobile technologies and services in East Africa has provided an important new platform with which institutions can widen access to education through m-learning (Mtebe & Raisamo, 2014). For example, tablets provide learners with the flexibility to learn anytime and anywhere through a wireless internet connection. Nonetheless, far too little research has been conducted to investigate factors that contribute towards students' adoption and use of tablets in the African context.

Some academics assert that there is limited evidence to validate the integration and acceptance of tablet among students in classrooms (Moran et al., 2010); however, Mang & Wardley (2012) have reviewed many different studies which have explored the integration of tablets in education. In studies of student perceptions of learning with tablet computers, there is a call for more research

over multiple courses with larger samples (Enriquez, 2010; Yang & Lin, 2010). What researchers have found when studying tablet use among students is that tablets can support the social construction of learning, assessment, motivation and engagement (Enriquez, 2010; Winter et al., 2010) and that when tablets are used in classroom activities, collaborative learning is produced, along with improved interactions with peers and teachers (Shuler et al., 2010). Moreover, a longitudinal study cited in Schnackenburg (2013) which was conducted in Belgium by Courtois et al., has shown that secondary level students used tablets in classrooms because they perceived them to be a useful and enjoyable tool, and not because their peers convinced them to use one as it was the newest technology. This finding is supported by an earlier study by Vondracek (2011), who reported that students who viewed video lectures on tablets found them to be useful and effective resources that allowed them to catch up more easily, especially if they missed a class. Furthermore, Ferrer et al., (2011) found that when using tablets in classrooms, low-performing students increased their test scores (Schnackenberg, 2013). Mang & Wardley (2012) therefore support the use of tablets in classrooms as it would appear to be productive.

A study of undergraduate and postgraduate students in KSA based on the UTAUT indicated that that performance expectancy is the key factor influencing students' adoption and intention to use m-learning in the future (Al-Hujran et al., 2014). It has been shown that in KSA and especially in Taif, that the readiness of university lecturers to use m-learning in higher education is strongly influenced by the variables of usefulness and perceived ease of use (Aljuaid et al., 2013).

A study by Seliaman and Al-Turki (2012) examined the educational use of mobile phones and tablets among university students in KSA based on the extended TAM (TAM2). The students used phones and tablets to access course materials, search the web for information related to their discipline, share knowledge and conduct assignments. This study unfortunately has limitations of scope as it dealt only with male students from a single college. A study developed and empirically tested a factor model for understanding college students' acceptance of tablets as a means to explain and improve their usage pattern in education at Midwestern institution (El-Gayar et al., 2011). Overall, the model provided satisfactory explanatory power for students' acceptance of tablets in an educational setting. Most remarkable is the need for programs aimed at influencing students' attitudes and perceptions towards tablets, creating an environment of positivity surrounding the use of tablets on campus, and facilitating their use (El-Gayar et al., 2011). A study by Mtebe & Raisam (2014) applied the UTAUT model to investigate students' behavioural intention to adopt and use mobile learning in higher education in East Africa. The results revealed that four factors of performance expectancy, effort expectancy, social influence, and facilitating conditions had a significant positive influence on students' mobile learning acceptance, with performance expectancy being the strongest predictor (Mtebe & Raisamo, 2014).

It is worth noting that some users are not willing to accept m-learning (Wang et al., 2009); for example, some university lecturers are reluctant to use it as they think they may face problems in trying to use it effectively as it is new and requires extra effort to implement (Abu-Al-Aish & Love, 2013). In their study Wang et al. (2009) also examined the factors of m-learning acceptance based on the UTAUT to explore whether age or gender differences play a significant role in the acceptance of m-learning. They concluded that performance expectancy, effort expectancy, social influence, perceived playfulness, and self-management of learning were significant factors of behavioural intention in accepting m-learning**.**

2.5.1.13 TAM and Motivation

Without user acceptance, educational technology cannot hope to deliver whatever value it may be capable of. Policy makers therefore need to know what motivates learners, educators and other stakeholders to accept or reject new educational technologies and how these motives are influenced by the design features of the technology (Martin et al., 2013; Teo, 2011). The TAM fundamentally examines technology acceptance from an extrinsic perspective (Cheung & Lee, 2011) regardless of whether the behaviour is extrinsically or intrinsically motivated, since the behaviour itself looks precisely the same. However, extrinsic and intrinsic motivation are two different drivers which determine the resulting behaviour. Understanding students' underlying motivation for the acceptance of a technology can help course designers and academic institutions develop better strategies for systems design and implementation. Therefore, there is a need to extend the original TAM to include both extrinsic and intrinsic motivation.

Schaik (2011) demonstrated the powerful role of intrinsic motivation in the acceptance of hedonic systems and recommended that intrinsic motivation should be a factor in technology acceptance models. Schaik's study used the UTAUT and showed that the effect of intrinsic motivation on performance expectancy is mediated by effort expectancy. Davis et al. (1992), found that both extrinsic and intrinsic factors significantly influence users' behavioural intentions to use an innovation. Igbaria and Iivari (1995) and Venkatesh (2000) obtained similar findings. Moreover, the empirical data in Ma and Yuen's study (2011) revealed significant relationships between the motivational factors, including performance expectancy, effort expectancy, social influence, intention and satisfaction. The results of these studies indicate that the TAM is indeed appropriate for investigating ICT adoption among student populations and specific findings support the application of the motivational perspectives theory (Cheung & Lee, 2011).

2.5.1.14 Summary

The TAM has been widely used in ICT research to help understand as well as explain user behaviours. This section has summarised the technology acceptance models and theories, including the factors relevant to each model, and review the origins and evolution of the TAM from 1975 to 2012. The TAM has succeeded in providing a model which is applicable across a broad range of end-user computing technologies and it can be concluded that the TAM framework is and can be the basis of robust and developing models of technology use in learning environments.

It is important to study what motivates students to use mobile devices with regard to tablet computers in order to provide a better understanding of what educators should consider when adopting m-learning in the classroom. Thus, the next section considers motivation definition and theories and how motivation relates to technology and mobile learning.

2.5.2 Motivation

2.5.2.1 Introduction

"To be motivated means to be moved to do something. A person who feels no impetus or inspiration to act is thus characterised as unmotivated" (Ryan & Deci, 2000:54). Everyone needs motivation in life as everyone has needs and goals and behaves in ways which fulfil these according to the strength of their motivation (Holtz, 2006). Thus, motivation can be considered as a necessary aspect to almost any part of life.

Researchers measure motivation in conjunction with cognitive responses such as recall and perception; affective responses such as subjective experience; and behavioural responses such as action and performance (Touré-Tillery & Fishbach, 2014). Cognitive views of motivation emphasise the importance of goals. Goals may not be well formulated and may change with experience, but the point is that individuals have something in mind that they are trying to attain or avoid (Pintrich & Schunk, 2002). As motivation involves goals that lead to direct action, there are two views of motivation; behavioural and cognitive (Masgoret & Gardner, 2003). Behavioural theories explain motivation in terms of observable phenomena. Behavioural theorists propose that explanations for motivation do not need to include thoughts and feelings and that people are instead motivated by environmental events. Cognitive theories, on the other hand, stress the causal role of mental structures and the processing of information and beliefs (Pintrich & Schunk, 2002). There are ways to measure motivation. To measure behavioural motivation, choice, speed, and performance can be measured, whereas to measure cognitive and affective motivation, activation, evaluation, and perception and the subjective experience can be measured (Touré-Tillery & Fishbach, 2014).

It is especially important to understand how motivation contributes to success in education (Al-Tamimi & Shuib, 2009; Lai, 2011). Researchers have established that how students think of their own ability to learn can affect how motivated they are (Barry, 2007; Murray, 2011). If students believe that they have limited ability for learning, they will not be academically motivated (Pintrich, 2003). The study of 'motivation' in its diversity of forms is a large academic field in itself (Nukpe, 2012); therefore, in any theory of education, motivation is considered as a major concept (Ball, 1977). It plays a crucial role and is an essential element in students' learning (Valerio, 2012). Human motivation theory is widely adopted in behavioural studies (Cheung & Lee, 2011) and previous studies have demonstrated that motivation is responsible for why behaviour starts, continues and stops, as well as what choices are made (Cheung & Lee, 2011).

Before any movement can be made to adopt the use of mobile devices in mainstream education, it is important to analyse whether students are motivated to use them for learning (Pollara, 2011). The following sections explore motivation in general, along with definitions and types, describes self-determination theory, and then in particular explores students' motivation to use mobile devices in their learning with regard to tablet computers.

2.5.2.2 Motivation Definitions

The term 'motivation' refers to the drives to act or behave in a certain way. It is the desire within individuals which causes them to act in ways which will enable them to achieve their goals (Shanks, 2007). Motivation refers to the psychological force which enables action (Touré-Tillery & Fishbach, 2014). In a classroom context, motivation is the result of students' subjective experiences; it is their willingness to participate in class activities as a result of their reasons for studying (Cheng & Yeh, 2009). Clearly, studying how motivation works is essential because it relates directly to behaviour and performance in the classroom.

The definition of the term motivation would seem to be a highly subjective one according to the literature (Al-Tamimi & Shuib, 2009; Gardner, 2006) and hardly a unitary phenomenon (Ryan & Deci, 2000), as each researcher explains it according to their own viewpoints, which differ in levels and types of motivation. Some have defined motivation simply as the expectancy of reward (Brown, 2000), thus connecting motivation to behaviour. On the other hand, Keller (1983) defined motivation as the decision whether to achieve or avoid goals and the degree of effort used and applied accordingly, linking motivation to cognitive processes. However, other researchers have added the dimension of social influence to explanations of motivation (Brown, 2000). Despite the differences between all the definitions of motivation, the concepts of "needs and drives" in motivation definition is highlighted (Al-Tamimi & Shuib, 2009). Another definition of motivation is

"the level of effort an individual is willing to expend toward the achievement of a certain goal" (Brennen, 2006:4) or simply the "reasons underlying behaviour" (Guay et al., 2010:712). A third sees it as "a function of a person's thought rather than some instinct, need or drive" (Ames & Ames, 1984:1). As a result, the term motivation refers to the drives for performing an action to complete a specific activity. In other words, it is considered to be the reason for the behaviour. Studying motivation may help to predict future behaviour (Kaewprapan & Suksakulchai, 2008).

One useful viewpoint theorises that behaviour can be extrinsically and intrinsically motivated, and this would seem an appropriate framework for the study of students' motivation (Deci & Ryan, 1985; Deci, 1975; Ryan & Deci, 2000). Deci and Ryan were not the first to identify the internal and external dimensions of motivation, but their theory is the most well-known (Nukpe, 2012).

2.5.2.3 Self-Determination Theory (SDT)

Self-determination theory (SDT) has encouraged a great deal of research on aspects of motivation in education (Brophy, 2010) and is used in the study of motivation associated with internal processes (Maehr, 1984). Moreover, it is one of the most comprehensive and empirically supported theories of motivation which is available today and has important implications for educational practice (Pintrich & Schunk, 2002). Deci and Ryan distinguish between different types of motivation based on the different reasons that lead to action. The most basic distinction in their theory is between intrinsic and extrinsic motivation (1985). Self-determination refers to the process of using the will (Deci & Ryan, 1980). To be self-determining, people have to decide how to act on their environment (Pintrich & Schunk, 2002). Deci and Ryan proposed that there are three basic innate psychological needs that underlie behaviour: competence (refers to the need to be effective in dealing with the environment), autonomy (refers to the need to control the course of our lives), and relatedness (refers to the need to the close relationships with others) (Deci & Ryan, 1980), and while SDT attempts to cover the range of all human behaviour, it recognises that only a subset of all behaviours is actually intrinsically motivated (Pintrich & Schunk, 2002).

Intrinsic motivation has emerged as an important phenomena for educators (Ryan & Deci, 2000) as intrinsic motivation results in high-quality learning, it is important to detail the factors that both support and undermine it (Ryan & Deci, 2000). In its initial stage, SDT appeared to have limited potential for classroom application, because it focused only on intrinsic motivation. Extrinsic incentives were later added (Brophy, 2010), since, for example, it is obvious that students may follow learning goals because they recognise their value, even though they may not find the process of learning enjoyable in itself. Most intrinsic motivation theorists do not differentiate between the affective/fun aspects and cognitive/learning aspects (Brophy, 2010) and currently intrinsic

motivation theorists tended to treat intrinsic and extrinsic motivations as opposites. Nevertheless, some intrinsic motivation theorists concede that extrinsic motivation can be used in ways that complement intrinsic motivation (Brophy, 2010).

It must be pointed out that many aspects of SDT are not clearly delineated and that the model is continually evolving. Indeed, researchers are increasingly conducting studies that add to our understanding of how this model can be applied to educational domains (Pintrich & Schunk, 2002). SDT has been criticised as on the grounds that the three basic needs of autonomy, competence and relatedness are inadequate (Buunk & Nauta, 2000; Carver & Scheier, 2000) and that this list needs to expand in order to include other needs such as self-preservation, safety, self-esteem and self-actualisation (Brophy, 2010). However, Deci and Rayan (2000) have responded by clarifying that their theory assumes that physical well-being is present in order to focus on factors influencing psychological well-being.

Intrinsic motivation alone cannot establish sufficient motivational basis for schooling in general or a predesigned curriculum in particular (Brophy, 2010), as it encourages students to engage in learning activities based on immediate satisfaction or enjoyment rather than on values. Additionally some psychologists claim that intrinsically motivated students do not experience this as a continual state but rather as a single event connected with a particular activity (Brophy, 2010). Definitions of intrinsic motivation tend to focus only on their affective features (e.g. fun, pleasure, or enjoyment) without paying much attention to their cognitive features (e.g. absorption, satisfaction, or self-realisation). Some theorists refers to intrinsic motivation only as an affective response to an activity but some refer to it as cognitive as well as affective.

On the other hand, students can be motivated to learn from an activity even if they do not find its content interesting or its process enjoyable. Motivation to learn can be contingent upon the adoption of learning goals and related strategies; it is not linked directly to either extrinsic motivation or intrinsic motivation. In general, motivation to learn is mainly a cognitive response and includes attempts to make sense of the activity, to understand the knowledge it develops, and to master the skills that it promotes. As other researchers study individual differences in motivational orientation, intrinsic and extrinsic motivation continues to be characterised as opposing poles of a single dimension (Lepper et al., 2005). However, this opposition of intrinsic and extrinsic is not always necessary or appropriate in the average classroom (Lepper et al., 2005). One of the most well-known of the individual difference scales is that of Harter (1981), which assesses intrinsic motivation solely in opposition to extrinsic motivation (Lepper et al., 2005). Across all Harter subscales, intrinsic and extrinsic motivation may not necessarily be polar opposites. It is tempting to think of intrinsic and extrinsic motivation as two ends of a continuum with intrinsic

motivation at the top and extrinsic motivation at the bottom, but in fact, there is no automatic relation between intrinsic and extrinsic motivation (Pintrich & Schunk, 2002). For example, for any given activity, a learner may be high in both, low on both, or any combination in between. We can see that intrinsic and extrinsic motivation are time and context dependent (Pintrich & Schunk, 2002), characterising individuals at a given point in time in relation to a particular activity. The same activity can be intrinsically and extrinsically motivating for different people as is shown in a study by Lepper et al., whose results confirm the value of independent assessments of both intrinsic and extrinsic motivation (2005).

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

2.5.2.4 Motivation Types

This section is focused more on the definitions of intrinsic and extrinsic motivation. Intrinsic and extrinsic types of motivation have been widely studied, and the distinction between them has shed important light on educational practices and research (Ryan & Deci, 2000). "Intrinsic motivation remains an important construct, reflecting the natural human propensity to learn and assimilate. However, extrinsic motivation is argued to vary considerably in its relative autonomy and thus can either reflect external control or true self-regulation." (Ryan & Deci, 2000:54). Based on motivation literature and in particular SDT, motivation can take either intrinsic or extrinsic forms.

2.5.2.4.1 Intrinsic Motivation

Intrinsic motivation is a fundamental mechanism for open-ended cognitive development since it is the driver of spontaneous exploration (Ryan & Deci, 2000). Intrinsically motivated behaviour is perceived as behaviour freely engaged in, which the person finds interesting and derives spontaneous satisfaction and enjoyment from (Reinholt, 2006). Thus, it remains a main construct, reflecting the natural human tendency to learn and assimilate (Ryan & Deci, 2000). Intrinsic motivation is what drives someone to do an activity for its own sake, i.e. the individual finds the activity itself interesting, engaging or in some way satisfying (Cheung & Lee, 2011).

Intrinsic motivation refers to doing something because it is inherently interesting or enjoyable (Ryan & Deci, 2000). It is defined as doing an activity for no apparent reinforcement other than the activity (Ramayah et al., 2003). It refers to engaging in an activity for its own sake, for the enjoyment, challenge, interest or natural fulfilment of curiosity (Barry & King, 2000) It refers to the desire to engage in behaviours for no reason other than absolute enjoyment, challenge, pleasure, or interest (Lepper et al., 2005). It is that which is generated by an individual's own desire to complete the task (Cheng & Yeh, 2009). In other words, intrinsic motivation leads individuals to perform for their own sake. Intrinsic motivation exists inside the person, and so exists in the relationship between the person and the task (Ryan & Deci, 2000). It is often associated with involvement in a complex task (Reinholt, 2006). Some academics treat intrinsic motivation as the affective quality of students' engagement in an activity; the degree to which they enjoy or derive pleasure from the experience (Brophy, 2010). This kind of intrinsic motivation is more typical of play activities than learning activities. Other academics emphasise the cognitive aspects of intrinsic motivation; the degree to which students find participation in the activity to be self-actualising, enriching or empowering (Brophy, 2010). According to Lepper & Hodell (1989) there are four sources of intrinsic motivation: challenge, which relates to the learner's skill and experience and the difficulty of the task; curiosity, which is relevant to the learner's current knowledge; control, which is relevant to the capabilities of learner; and fantasy, which relates to the willingness of learner to pretend. Moreover, the perception of self-efficacy is one of the critical determinants of intrinsic motivation (Bandura, 1986, 1989).

It has been found that students' beliefs about their capabilities is related to motivation (Pintrich & Schunk, 2002). Motivating students to learn for the desire of learning can open up a world of opportunities. Intrinsic motivation is an important part of students' learning (Valerio, 2012). Students who feel self-confident about learning seek challenges and expend effort to learn new material. Several motivation theories stress the role of perceived capabilities in motivation, and how such beliefs fit into a broad motivational framework (Pintrich & Schunk, 2002).

2.5.2.4.2 Extrinsic Motivation

On the other hand, extrinsic motivation is claimed to vary noticeably in its relative autonomy and so can either reflect external control or true self-regulation (Ryan & Deci, 2000). It is often associated with the engagement in the activity because this activity leads to desirable consequences separate from the activity such as tangible rewards and hence the behaviour is a process to an end and not involved in for its own sake (Reinholt, 2006). It relates to a wide variety of different behaviours which are engaged in for an external gain, such as reward, recognition, grades or the dictates of others (Cheung & Lee, 2011; Yahaya et al., 2010). Extrinsic motivation

refers to the performance of an activity because it is perceived to be instrumental in achieving valued outcomes which are different to the activity itself (Ryan & Deci, 2000; Ramayah et al., 2003). Extrinsic motivation comes from outside the individual, for example, the offering of incentives for successful task performance such as stickers or point systems (Sternberg & Williams, 2002). It thus originates from external factors (Cheng & Yeh, 2009) and leads people to perform in order to gain external rewards. It is argued that extrinsic motivation is important in relation to an unattractive and simple task (Reinholt, 2006).

2.5.2.4.3 Overview of Intrinsic and Extrinsic Motivation

A study by Flink et al. (1992), cited in Brophy (2010), claimed that most adults believe that rewards are effective, not only as reasons for motivating students to put forth effort, but also for stimulating their intrinsic interest in the activities. Thus, extrinsic motivation strategies are intended to encourage students to engage in classroom activities fully because completing these successfully will yield rewards. When motivation is purely extrinsic, the activity itself becomes devalued except as an instrument used in order to obtain valued rewards. Nevertheless, intrinsic motivational strategies apply when students value the activity itself (Brophy, 2010). These strategies are based on the idea that teachers should emphasise activities that students find them enjoyable, so that they engage in these activities willingly without any need for extrinsic motivation.

The idea of intrinsic motivation is something that is of great interest to educational psychologists in particular, since it implies that there are already predispositions within an individual's psychological make-up that may be activated by particular influences (Lepper et al., 2005; Nukpe, 2012). An intrinsically motivated student will be very focused on details and processes while an extrinsically motivated one will focus on results and rewards for achievement (Nukpe, 2012). Lepper and Hodell (1989) recommended that academics should to enhance student's intrinsic motivation. Moreover, Ayotola (1998) highlighted the important role of the teacher in strengthening students' intrinsic motivation.

Among adult students, once intrinsic motivation decreases for any reason, extrinsic incentives become increasingly important if students are to be kept on task (Lepper & Hodell, 1989). Accordingly, it is important to know whether students are intrinsically motivated or not before assigning tasks or making decisions. Younger children have higher levels of intrinsic motivation than older people (Lepper et al., 2005; Lepper & Hodell, 1989). Lepper and Hodell also found that children chose activities only if there was a tangible reward, and recommended that teachers should focus more on making children extrinsically motivated in classrooms because they are already intrinsically motivated (1989). Students can perform extrinsically motivated actions with an

attitude that reflects an inner acceptance of the value of a task (Ryan & Deci, 2000). Understanding extrinsic motivation and what fosters it is an important issue for educators who cannot always rely on intrinsic motivation to stimulate learning (Ryan & Deci, 2000). As they get older it seems that students can lose their enjoyment of the learning process itself i.e. their intrinsic motivation, and instead learn in order to achieve their goals, i.e. via extrinsic motivation (Lepper et al., 2005). For example, studying for an exam is not generally considered as an inherently interesting task, but students do it because passing the exam is an important personal goal. Student motivation is about goals, drive and having a reason to do what they do and do it to the best of their ability (Nukpe, 2012). Higher levels of motivation lead to students having greater confidence and capacity to achieve (self-efficacy).

The degree of academic engagement can be assessed when students combine behaviours such as getting along with teachers, having interest in the subject matter, and showing positive attitudes towards activities (Nukpe, 2012). It has also been found that when teachers' confidence is high, students' display greater levels of motivation (Nukpe, 2012). When students enter higher education, there are many different factors that have an impact on their motivation, such as their preparation for university (how much information the university has given them), course choice, future aspirations and their perceptions about higher education (Nukpe, 2012). For example, students can be demotivated or frustrated when having problems with registration of modules, timetable changes and/or assessment/examination deferrals (Nukpe, 2012).

Lepper et al. (2005) suggested that future research should develop motivational assessments that track intrinsic and extrinsic motivations simultaneously. Working to enhance both intrinsic motivation and the internalisation of extrinsic motivation may help to minimise the loss of students' motivation to learn.

2.5.2.5 Motivation and Learning with Technology

Several studies have found that technology can motivate students, and that this results in improved learning and the achievement of better results. For example, Heafner (2004) studied how technology can motivate social studies students to learn, and a recent study by Wilkinson and Lancaster (2014) looked at the use of technology in improving students' motivation to become successful learners in the fields of science, technology, engineering and maths (STEM). However, few studies have dealt with individuals' motivation to use technology, e.g. that by Surry and Land (2000), who researched students' intrinsic and extrinsic motivation as the key to technology adoption in higher education.

Although it is often presumed that students will be naturally motivated to use technologies for learning (Martin et al., 2013), educators need to understand in particular what motivates students for learning purposes either intrinsically or/and extrinsically (Martin, 2011). Furthermore, motivation theorists have argued that the usage is determined by both intrinsic and extrinsic motivation and that users adopt technology because its use is considered as enjoyable and because they gain some benefits from its use (Teo et al., 1999). However, Fagan et al., (2008) found that extrinsic motivation had a strong relationship with the intention to use technology whereas intrinsic motivation did not. However, intrinsic motivation had a significant relationship with extrinsic motivation, where intrinsic motivation represented perceived enjoyment and extrinsic motivation represented perceived usefulness. On the other hand, it has been asserted that intrinsic and extrinsic motivation has a strong relationship with the internet use (Ramayah et al., 2003). Additionally, Teo et al. (1999) reported that extrinsic motivation is generally stronger than intrinsic motivation. Thus, the impact of intrinsic and extrinsic motivation on technology usage is important to study.

Roblyer & Doering (2010) suggest that by adopting new technologies that are meaningful for students and which support their goals, students will be more motivated to learn. Some studies concluded that the use of technologies may improve students' achievement (Flanagan, 2008; Johnson, 2014). Moreover, Martin et al. (2013) and Higgins et al. (2012) have pointed out that some studies indicate that technological innovations are more likely to be embraced by students than by their lecturers or teachers, and that this may affect students' perceptions of using technology to support their learning. They also stated that one of the main factors influencing students' perceptions of the value of technology in their academic success was their lecturer's motivation to use the technology as well as the quality of their lecturer's use of technology for teaching (Martin et al., 2013; Martin, 2011; Pollara, 2011).

2.5.2.6 Motivation for Using Mobile Devices in Learning

M-learning can be influenced by many components relating to student attributes, lecturers and their teaching, and the learning context (Martin, 2011). Therefore, it is important to study what motivates students to use mobile devices for learning in order to provide a better understanding of what educators should consider when adopting m-learning (Martin et al., 2013). Students who learn with mobile devices need to be motivated not only to learn, but also to use mobile devices in order to support their learning (Martin et al., 2013). This was clear in previous studies in which high levels of student motivation were linked with successful adoption of laptops use in learning (Hall & Elliott, 2003; Newhouse, 2001). On the other hand, students are aware of how the use of mobile devices can impact their motivation to engage in m-learning since they believe that they would like to

participate in class activities and discussions inside and outside the class if they could use their mobile devices (Pollara, 2011).

Martin et al. (2013) have studied student motivation to adopt m-learning and reported that mobility was the main motivator, along with others like productivity, performance outcomes, the learning experience, information access, the lecturer, authoring, entertainment and social interaction. An interesting result was found by Martin (2011), in that what motivated the students in his study was not better grades but access to information on the web, followed by access to learning resources and communication with friends and only then better grades. Moreover, Martin (2011) also identified the factors which influenced students' engagement in m-learning as goal orientation, technology focus, prior knowledge, experience, perceived mobility, age, and gender. In addition, Sha et al. (2012) suggested that some of the characteristics of m-learning, such as student-centered approaches and personalisation of learning also require learners to be motivated in their learning.

Seifert and O'Keefe (2001) emphasised that students need to feel confident and have a sense of control over their learning in order to become motivated. Moreover, Laurillard (2007), cited in Martin et al. (2013), reported that m-learning is an activity that is intrinsically motivating for students by providing control over learning goals, ownership, fun and communication. However, if there is no investigation of what motivates students to use mobile devices for m-learning, there can be little assurance as to whether this happens spontaneously or whether there are certain motivators that make students want to engage in m-learning (Martin et al., 2013).

Studies conducted by Demb et al. (2004) and Kuo (2005) reported that students perceived wireless laptops to be useful and efficient for learning and this motivated their use for this purpose. On the other hand, students' perceptions of the value of laptops in academic success was strongly correlated with their perception of the success of the faculty in adopting the laptop into teaching and classroom activity (Demb et al., 2004) and so student perception of faculty utilisation of the computer in classroom activities was the most powerful factor influencing student feeling that laptops were essential to learning.

One of the factors that may influence students' motivation to use mobile devices in their learning is the students' attitude towards the mobile devices. Investigating attitude of subjects with common traits hold is value simply because it is assumed that these attitude will influence behaviour (Black, 1999). Attitudes toward internet use were found to be the most important factor in predicting perceptions of wireless laptops, followed by gender and experience with wireless laptops (Kuo, 2005).

Research by Kuo (2005) shows that students' past experiences of using the internet and laptops can influence their perceptions of using wireless laptops for learning and their attitudes toward using the internet. Perceptions may influence the success of m-learning and hence, obtaining the perceptions of those involved in m-learning could provide a valuable understanding of the reasons for the success or failure of adopting mobile devices in learning (Martin, 2011).

2.5.2.7 Motivation and Tablet Computers

Dekkers et al. (2012) have asserted that tablet computer use supports the teaching and learning process, and a study by Wilkinson and Lancaster (2014) found that students became more motivated if they were able to use a tablet computer as a learning medium. Another study investigated how engineering academics can be encouraged to use tablets in order to improve students' understanding of the course content via formative assessment feedback. The motivation of students to use tablets has actually arisen from the ability to access enjoyable learning content independently (Clarke & Svanaes, 2014). Additionally, the use of tablet devices facilitates the achievement of many of the major education elements required and their adoption comes with many benefits for learning, which include motivation and engagement (Fabian & MacLean, 2014).

2.5.2.8 Summary

Motivation is an important aspect of almost every part of life and consequently it is especially important to understand how it contributes to success in education. The concept of motivation as a key predictor of the use of technology devices and services is theoretically supported in the literature. In order for students to want to adopt technology use in higher education, they need to believe that it will help them to fulfil their needs and achieve their goals. Therefore, administrators and policy makers need to understand technological change from the students' perspectives.

Although motivation is hard to define, this research defines it as the driver for performing an action in order to complete a specific task. In other words, it is considered as the reason behind the behaviour. The study of motivation can help to predict future behaviour.

Self-determination theory (SDT) is one of the most comprehensive and empirically supported theories of motivation. In SDT, the most basic distinction is between intrinsic and extrinsic motivation. Intrinsic motivation refers to doing something because it is inherently interesting or enjoyable whereas extrinsic motivation refers to doing something because it leads to a separable outcome.

It is important to study what motivates students to use tablet computers in m-learning in order to provide a better understanding of what educators should consider when adopting m-learning in the

classroom. According to previous studies, there are many factors that may influence students' motivation to use mobile devices in their learning, such as perceived mobility, accessing information, authoring (i.e. writing, blogging, note taking), communication, the students' attitude towards the mobile device, students' ability and self-efficacy, fun, students' productivity, performance outcomes, experience, the teachers' motivation and perceptions, perceived usefulness, and the faculty support of the device.

2.6 The Proposed Model

2.6.1 Introduction

As the aim of this study is to create a better understanding of female undergraduate students' attitudes and use of tablet computers based on technology acceptance and motivation models, this section discusses a proposed model for the study, giving a brief outline along with justification for choosing the original technology acceptance and self-determination theory. The model is systematically analysed and refined in the light of interviews with students, student questionnaires, and then expert analysis interviews.

The user's acceptance of technology is reflected through psychological models and theories to explore whether or not users benefit from systems and tools. Therefore, technology acceptance models and motivation models are the theoretical foundation of this research.

Interaction between humans and technology is influenced by a number of social and psychological factors and characteristics (Taiwo & Downe, 2013). A number of models have been developed to investigate and identify the determinants influencing the acceptance of computer technology. Models designed to analyse user acceptance, adoption and usage behaviour include: the theory of reasoned action (TRA), the technology acceptance model (TAM), the motivation model (MM), combined TAM-TPB, the extension of TAM (TAM2), the unified theory of acceptance and use of technology (UTAUT), technology acceptance model 3 (TAM3) and the extension of the unified theory of acceptance and use of technology (UTAUT2). In this study, the original TAM has been chosen as a theoretical underpinning of this study.

Before any move can be made to adopt a particular technology into mainstream education, it is important to determine whether or not students are motivated to use it in their learning (Pollara, 2011) and to identify the motivators. The need to explore student motivation is well stated in the academic literature and many models and theories of motivation have been developed. However,

in this study, self-determination theory (SDT) has been chosen as the more suitable framework for understanding motivation from intrinsic and extrinsic perspectives.

2.6.2 Justification for Choosing the Original TAM and SDT Models

In exploring potential models for the study, the model first considered was the technological pedagogical and content knowledge (TPACK) model, which is a framework for teachers' knowledge of technology integration (Koehler & Mishra, 2009). This framework builds on Lee Shulman's construct of pedagogical content knowledge (PCK) to include knowledge of technology. The development of TPACK is critical to effective teaching using technology; however, it was decided against using this model as the research focuses more on students' perceptions and also because the tablet is not yet current within the learning context of the study. Instead, the original TAM has been chosen and integrated with SDT model.

Activity theory is a well-established theory and was designed by Leontiev in 1920s to study the relationship between the subject and object in forming the core of activity (Hasan & Kazlauskas, 2014). Thus, it is used to better understand human activity. It could be used in conceptualising take up of ICT. However, this study aims to study the factors that influence female undergraduate students' acceptance of and motivation to learn with tablet and hence this theory is not suitable to this study context as it focuses only on the engagement between the subject and the object which leads to the outcome.

Nowadays, it is becoming difficult to ignore the role of mobile learning in enhancing higher education (Mtebe & Raisamo, 2014). Therefore, there is a need to determine factors that influence learners' acceptance of mobile learning in education in order to facilitate its adoption and use.

The original TAM model is suitable for this study as it can measure the acceptance of the technology in higher education. Since the tablet is not yet commonly used within HE in Kingdom of Saudi Arabia, it is advisable to discover first whether students will accept it as a learning tool before asking policy makers to introduce it as standard. The advantage of the original TAM is that it is flexible and can be modified depending on the purpose of the study (Šumak et al., 2011). Construction of a general model which considers all of the factors involved in all technology acceptance models would be too complex, since many of the same factors have been defined and labelled differently depending on the application. The original TAM model can be expanded to include additional beliefs that may affect technology acceptance (Adwan et al., 2013). Moreover, the original TAM seems to be positively indicated for understanding conceptual issues related to ICT use. The determinants of the original TAM model are: perceived usefulness, perceived ease of use, attitudes towards usage, intention to use and actual use.

Moreover, it is important to understand how motivation contributes to success in education in general (Al-Tamimi & Shuib, 2009; Lai, 2011) and to educational technology in particular in order to identify what educators should consider when introducing m-learning (Martin et al., 2013). Moreover, before adopting technology devices into mainstream education, it is important to analyse students' motivation to use them for learning (Pollara, 2011).

SDT was chosen since the study explores the reasons why students need to use tablets in their learning from intrinsic and extrinsic perspectives. Although there is much debate in the literature on whether individuals need to have both types of motivation, I believe it is necessary to study both the intrinsic and extrinsic incentives of students. This study deals with higher education students, so they are old enough to discuss and assess their intrinsic and extrinsic incentives. According to the literature, children are intrinsically motivated but they need extrinsic rewards to motivate them well. However, as children get older, their intrinsic motivation decreases as they realise they are required to study whether they are motivated or not. Yet, in order to become more motivated and produce better work, individuals need to find learning enjoyable and interesting as well as recognise its value in terms of reward. Understanding extrinsic motivation is an important issue for educators who cannot always rely on intrinsic motivation to encourage learning. Therefore, when talking about higher education students, we need to consider their intrinsic as well as extrinsic motivation. This research looks at intrinsic motivation because studies have shown that intrinsic motivation decreases as students get older and also because HE students are old enough to talk about intrinsic motivation. We also look at extrinsic motivation, since everyone can do better when extrinsically motivated.

2.6.3 Motivation and Acceptance of Learning with Tablets (MALT): First Version

This study utilises the original TAM to measure the variables that influence the intention to use tablet computers as well as their actual use. In adapting the TAM to the requirements of the research questions, I have integrated motivational aspects into the model, since educational psychologists have long recognised that motivation affects the outcomes of learning (Al-Tamimi & Shuib, 2009; Lai, 2011). The aim of the study is to analyse both motivation and acceptance in the context of tablet use to give a better understanding of female undergraduate students' attitudes towards and use of tablet computers. Shroff et al. (2011) citing Dillon and Morris (1998), define technology acceptance as "the demonstrable willingness within a user group to employ ICT for the tasks it was designed to support" (p.5). From this it is assumed that motivation can be related to the TAM as it refers to the willingness to act and helps us to understand behaviour. However, Howard et al. (2010) have stated that TAM fails to treat motivation appropriately and that this has led to the limited understanding of motivation within the information systems field. According to

them, the determinant of perceived usefulness is not an example of extrinsic motivation and enjoyment is not an example of intrinsic motivation. Nevertheless, other researchers of technology acceptance models argue that perceived usefulness is an instrumental belief that is similar to extrinsic motivation with regard to the benefits of using a system and that enjoyment is similar to intrinsic motivation (Davis et al., 1989; Davis, 1989; Venkatesh & Bala, 2008; Venkatesh et al., 2003; Yi & Hwang, 2003). It can be suggested that perceived usefulness and ease of use are similar to extrinsic and enjoyment is similar to intrinsic motivation.

The proposed model in this study is an integration of the motivational model and the technology acceptance model. Thus, I have called it the model of *Motivation and Acceptance of Learning with Tablets* (MALT)**.** I developed the first version of the model Figure 9 using the study findings discussed in the literature review. The model is based on the original TAM and SDT. The selected factors are as follows: perceived self-efficacy, perceived enjoyment, perceived usefulness, perceived ease of use, attitude and behavioural intention. Behavioural intention in this model is the dependent variable. There are also five moderating variables, which are: experience, skill, discipline, facilities and access.

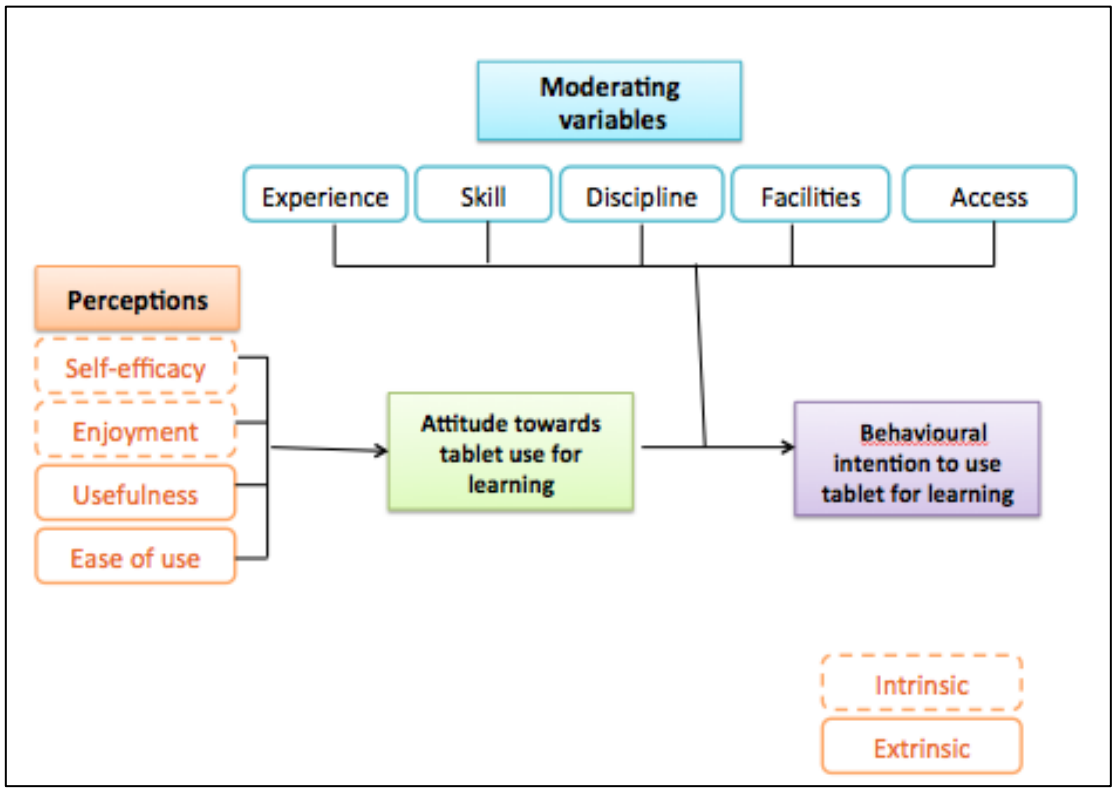

Figure 9 The first version of MALT

According to this model, students' behavioural intention for adopting the use of tablet is determined by attitude towards using tablet. Attitude towards using tablet is determined by

extrinsic motivation of perceived usefulness and perceived ease of use, and intrinsic motivation of perceived self-efficacy, and perceived enjoyment. In this model, the variable of actual usage has not been included, as Bagozzi (2007) views intention as the immediate factor in behaviour, asserting that the intention-behaviour link is possibly the most uncritically accepted assumption in social science research in general and ICT research in particular. Instead, in this model, students' behavioural intention is considered as the dependent variable.

This section does not include any definitions of the model constructs as they have been defined in chapter four in section MALT Model: Second Version and can also be found in appendix G Table 31.

2.6.4 Summary

This section has introduced the proposed model for this study. A better understanding of the different factors that influence users' motivation and acceptance of technology is crucial. Therefore, this study has developed its own model, named as *Motivation and Acceptance of Learning with Tablet* (MALT) to examine whether investigating the motivation for and acceptance of tablet use gives a better understanding of attitudes towards tablet use in the higher education context. The original TAM and SDT models have been chosen as the theoretical foundation because they are psychological models that can predict behaviour.

The original TAM model has been chosen in this study as it measures the acceptance of tablet use. Tablets are not yet part of the learning context of this study, and so I believe it is better to understand first whether students accept or reject this kind of technology before implementing it. The advantage of the original TAM is that it is flexible and can be modified depending on the purpose of the study. SDT has been chosen because the study explores the factors from the motivational aspect and investigates the intrinsic and extrinsic motivation for students using tablets in their learning.

The model has been developed first from the literature review and is then amended and verified later in the thesis according to students' responses.

The factors included in this model are behavioural intention to use a tablet and attitude towards using a tablet. There are four factors related to perception, which are self-efficacy, enjoyment, usefulness and ease of use. Based on SDT definitions of intrinsic and extrinsic motivation, usefulness and ease of use are forms of extrinsic motivation while self-efficacy and enjoyment are forms of intrinsic motivation. A number of moderating variables are also considered, these being access, experience, skills, discipline and facilities.

Chapter 3: Research Design

3.1 Introduction

This chapter provides a thorough discussion of the philosophical assumptions of the researcher and the approaches taken in the research methodology for this specific study. It identifies the exploratory sequential mixed-methods design in general. Additionally, it provides justification of the use of interviews and questionnaires as appropriate data collection methods, and describes the sample group of students from King Abdulaziz University (KAU), Kingdom of Saudi Arabia (KSA), and Saudi experts in technology acceptance model (TAM) on which this research is focused. It also outlines the pilot study, explains the sampling methods, describes the procedures of data analysis and ethical consideration, and discusses the validity and reliability of the study.

This research aims to provide a more comprehensive understanding of students' attitudes towards tablet computers use in learning by identifying the factors that influence their motivation and acceptance of tablet use for learning in higher education in KSA. The study explores students' preferred ways to learn with tablets as well as the potential barriers to their use. The work is based on models of technology acceptance and motivation. Finally, as this research uses human resources, it considers the ethics involved to ensure that the study has been conducted without violating any ethical principles.

Research methodology deals with the theories and concepts behind the methods used to systematically solve a research problem (Kothari, 2004). According to Dawson (2006), research methodology refers to the general principle that guides the research questions (see section 1.6). The research objectives are organised in order to answer the research questions in an acceptable way (see section 1.8).

3.2 The Research Paradigm

3.2.1 Introduction

The term paradigm can be defined as the shared beliefs of researchers regarding the assumptions and methods used in research (Creswell & Clark, 2011; Teddlie & Tashakkori, 2010). The term also encompasses the characteristics of the adopted world view and its philosophical foundations (Cohen et al., 2011). The two main paradigms used in research are the scientific (or positivistic) and the naturalistic (Kumar, 1999). However, Lincoln et al. (2011) acknowledge five paradigms, which are positivism, post-positivism, critical theories, constructivism and the participatory paradigm,

while Creswell (2014) recognises four widely adopted world views in social science research: the postpositivist, constructivist, transformative and pragmatist paradigms.

Applying one paradigm to all research problems can be misleading and inappropriate (Kumar, 1999). The philosophical underpinnings of the mixed methods approach have been widely discussed (Cohen et al., 2011) and raise the issue of whether a single philosophy, such as pragmatism, is appropriate to such a study or whether multiple worldviews should be incorporated according to the number of methods used. It seems, however, that the mixed methods approach can indeed work within the pragmatist paradigm (Cohen et al., 2011). The discussion also raises concerns about whether paradigms can be mixed or integrated in a mixed methods study (Tashakkori & Creswell, 2007). The following section will discuss the researcher's positionality in relation to this issue in more detail.

3.2.2 Positionality

Researcher positionality refers to the relationship between the researcher and the research topic and is determined by where one stands in relation to the other (Bourke, 2014). Establishing positionality can explain researchers' assumptions and beliefs and enable them to choose those methods which are most congruent with the research philosophy adopted and which will better arrive at the 'truth'.

My study is concerned with education, and research in this field recognises three main paradigms: the scientific, which seeks to generalise; the interpretive, which seeks to understand; and the critical, which seeks to emancipate (Scotland, 2012). By understanding the philosophical assumptions that support each of these paradigms and how they manifest themselves within methodology and methods, researchers will be able to define their position more accurately (Scotland, 2012). Each paradigm has differing components of ontology, epistemology, axiology and methodology.

Ontology is the study of the nature of reality and being (Cohen et al., 2011; Crotty, 1989). We ask ourselves, what is reality and how can we understand it? According to philosophy, what we would like to call 'truth' is really little more than an assertion of that which we have been persuaded (Bailey, 2004). Therefore, researchers must position themselves according to their views of how things really are and how they work (Scotland, 2012). However, some researchers believe in multiple truths (pluralism) (Lynch, 2009; Pedersen & Wright, 2013).

In contrast to the physical sciences, which study tangible and more easily identifiable subjects, social sciences deal with the abstract and less easily defined areas of human behaviour and

relationships (Thomas, 2013). People act differently, do strange things, and learn and change; the issue for social scientists is how to perceive and study this behaviour (Thomas, 2013). In order to reflect on my ontology, I need to ask myself whether the research process has reshaped my thinking and beliefs as a researcher (Willig, 2001) and what it is that I am studying (Thomas, 2013). I believe that truth exists 'out there', but also that it can change according to individual views and interpretations. In this study, I provide multiple perspectives in proposing and testing the research model.

Epistemology is the study of the nature and forms of knowledge (Cohen et al., 2011); it is the study of our knowledge of the world (Thomas, 2013). What is valid knowledge? How can it be acquired? In order to reflect on my epistemology, I need to ask myself how successful I have been in finding out 'the truth'. Did I ask the right questions? Epistemological assumptions are made as to how knowledge can be created and acquired (Willig, 2001). In order to form my epistemology, I will acquire knowledge by reading and reviewing previous studies in the field, and by collecting mixed data from a variety of people (e.g. with different occupations). I am a practical person who makes decisions according to practical results, and thus I propose to conduct an empirical study.

As the acquisition of acceptable knowledge is dependent on my research questions (Cohen et al., 2011), not only do I need to observe phenomena to obtain credible data, but I must also aim to understand participants' views about this phenomena. Thus, I need to be practical in collecting data which are relevant to the research questions (Creswell & Clark, 2011). Moreover, I believe that some truths can be right today but wrong tomorrow.

As a result, the ontology concerns what is observed in the social science world and the epistemology deals with how knowledge of it is constructed (Creswell, 2007). In the current research, the twin strands of students' motivation to use tablet computers technology and their acceptance of this technology are studied firstly by reviewing current literature and secondly by collecting mixed data from a sample of students and experts. In considering the nature of my research in the area of technology acceptance, I can observe the social world in which technology acceptance and motivation are constructed by individuals. I can also make assumptions about this world in terms of the factors influencing technology acceptance and motivation, and I can examine and measure the relationships between these factors.

Both deductive and inductive strategies form the basis of reasoning in this study (Thomas, 2013). They are the "logical reasoning that are used in every type of research" (Reichertz, 2014:123). According to Reichertz, "deduction begins with a valid law and asserts that something will behave in a certain way. Induction observes individual parts of the unique diversity of the world and

attempts to determine rules and laws to order its infinite manifestation" (Reichertz, 2014:130). In contrast to deductive strategy, in which the proposed framework is accepted or refuted (Burnett, 2009) and does not produce new truth (Reichertz, 2014), inductive strategy begins with collecting the data to form a theory (Burnett, 2009). However, researchers can combine the deductive approach with the inductive (Edmonds & Kennedy, 2013) especially when adopting the pragmatic paradigm (Creswell & Clark, 2011).

In terms of axiology, which refers to the role of values in research, can research be value-free or is it shaped by our own values? Educational research is always framed in terms of specific values. It is important to identify key values and what implications can be drawn from them with regard to particular issues in particular contexts (Hammersley, 2007).

The core value of my research is the quality of m-learning, and I would like to convince the Ministry of Education in KSA to adopt the use of tablet computers in universities. I think that tablets will enhance and support learning but first I need to demonstrate a better understanding of female undergraduate students' motivation and acceptance of tablet use for learning. I believe that students would be able to use tablets to access Blackboard, use mobile applications, read material, submit assignments, watch tutorials videos, take notes, communicate with their teacher and receive online feedback. In order to avoid the effect of bias, I have used indirect questions at the beginning of the interview. For both the interview and the online questionnaire, if students answer no to the question, they are moved onto another, but if they answer yes, they continue with the sub-questions. Both opinions have been presented when interpreting the findings. In the questionnaire, the option of "Neutral" is provided to reduce the bias. The use of mixed methods (i.e. interview and questionnaire), as well as different kinds of participants (students and experts), allows triangulation of the data, which might reduce the bias. My values play a large role in interpreting the results and I adopt both subjective and objective points of view, using deductive and inductive strategies of thinking to avoid bias. However, there may be a kind of bias when conducting this research.

Bourke (2014) has stated that positionality characterises a space where objectivism and subjectivism meet. According to his views, we can never be purely objective, as we have to say who we are not just researchers we are individuals and members of groups. Thus, my positionality can be said to embrace both objectivity and subjectivity together. This can be distinguished from the positivist view, which can only be objective (Rowbottom & Aiston, 2006). Being objective is necessary but not sufficient in itself, as researchers also need to be subjective in order to understand the nature of the problem according to their own personal viewpoint (Harding, 1977; Cousin, 2010) particularly in the social science field (Thomas, 2013).

The term 'insider' means that the researcher is or was a member of the organisational systems or community where the research is to be carried out (Brannick & Coghlan 2007; Hellawell 2006; Unluer, 2012). In order to explore the inner thoughts, perceptions and attitudes of the participants, the insider position needs to be adopted through engagement with the research context and interactions with participants (Merton, 1973). In this context of the planned study I can be considered as an insider, since I studied for my bachelor's degree at the same university. I have also worked at this university, am a Saudi Arabian, and will conduct the study within the Saudi community. Being an insider is thus helpful in gathering the data. Morse has advised, however, that "It is not wise for an investigator to conduct a qualitative study in a setting where he or she is already employed and has a work role" (Morse 1998:61). Thus, because of my insider status, I have chosen the mixed methods approach. One of the challenges of being an insider is that the participants may be inclined to give me the answers they think I am looking for (Unluer, 2012) and this would be considered as introducing bias (Mercer, 2007). So, to minimise this tendency according to the principles of social desirability reporting (SDR), I will use a mixture of indirect questioning and mixed methods to collect the data (Hellawell, 2006; Macfarlane, Zhang, & Pun, 2014). To further avoid the problems of being an insider, I use confidential questionnaires to increase the chances of the participants providing honest responses. Insiders have the advantage of possessing a great deal of knowledge about the context, which can take outsiders a long time to obtain (Unluer, 2012). In order to conduct credible insider research, the researcher must be aware of the effects of perceived bias on data collection and analysis with respect to the ethical issues relating to anonymity (Unluer, 2012). Mercer (2007) has suggested that although participants will form preconceptions about any researcher, it is usually better for researchers not to announce their own opinions about their research topic, nor to contribute their own stories in interviews. Thus, personal beliefs, philosophical assumptions and biases affect the researcher's positionality.

Methodology refers to the theoretical rationale 'principles' that explain what research methods are appropriate to a field of study (Cohen et al., 2011). It is the strategy of actions that underpin the choice and use of particular methods or techniques (Crotty, 1989). Therefore, methodology comes with questions as to why, what, from where, when and how data is collected and analysed (Scotland, 2012).

I intend to apply a mixed methods approach to the research, as it is one of the features of pragmatism, and I shall attempt to consider various viewpoints, perspectives and positions (Johnson et al., 2007). I favour the mixed methods approach because I believe it is better suited to addressing and providing answers to my research questions (Cohen et al., 2011; Creswell & Clark, 2011). Mixed methods research can be defined as a combination of elements of qualitative and quantitative research approaches for the purposes of breadth and depth of understanding and

corroboration as well as providing the most informative, balanced, and useful research findings and outcomes (Johnson et al., 2007). What is important to me as a researcher and a pragmatist is to generate important research questions and to provide acceptable answers to those questions (Cohen et al., 2011). Choosing the most suitable methodology for the study depends on its goal and objectives (ACET Inc., 2013; Heyvaert et al., 2011).

The choice of investigation methods in a research study is affected by the positionality. Methods are the specific techniques and procedures used to collect and analyse data (Scotland, 2012). Researchers with different ontological and epistemological positions often take different research approaches towards the same phenomenon (Scotland, 2012). In answering the research main and sub-questions, all will be answered using mixed methods. I will be flexible in the way that I use techniques that are more appropriate to the investigation as long as they provide enough and better evidence (Thorpe & Moscarola, 1991). At the end of this study, I plan to talk to policy makers and give them access to my study findings after acquiring a better understanding of the situation. This goal demands the use of a quantitative method as the data will need to be generalised to the chosen population, which is only possible using this approach. According to Johnson et al. (2007), variation in specific philosophical commitments should be welcomed in mixed methods research, and researchers should consider these differences as an important part of the mixed methods research paradigm. In addressing the credibility, validity and trustworthiness of my research, I used triangulation of methods, random sampling, and different types of participants. Peer scrutiny of data is used to ensure that my study actually measures what it is intended to (Shenton, 2004).

Pragmatism is the adoption of practical and pluralistic study methods rather than idealistic ones (Cohen et al., 2011; Creswell & Clark, 2011). It is a “set of ideas articulated by many people, from historical figures, such as John Dewey, William James, and Charles Sanders Peirce, to contemporaries, such as Cherryhomes (1992) and Murphy (1990)” (Creswell & Clark, 2011:43). Thus, there are many types of pragmatism (Creswell, 2007). The pragmatic paradigm has been adopted in this study as it has positive virtues and reflects the researcher’s view of the world. Pragmatism “should not be understood as a philosophical position among others, but rather as a set of philosophical tools that can be used to address problems” (Teddlie & Tashakkori, 2010:17). It is associated with using mixed methods research (Creswell & Clark, 2011). I believe that social reality and social knowledge are prone to change (Burnett, 2009), particularly in the field of educational technology; as technology is updated, so information or knowledge can be out of date. Moreover, as a pragmatist, I believe that we need to stop asking questions about reality and laws of nature (Creswell, 2014) although these kind of questions are important in shaping the research inquiry (Thomas, 2013). Moreover, I do not see the world as an absolute unity (Creswell, 2014). In addition, truth is what works at the time, hence the use of mixed methods to provide acceptable

answers to the research questions (Cohen et al., 2011; Creswell, 2014). Mixed methods is viewed more as pragmatism in the way that it efficiently combines the philosophical approaches of deductive and inductive reasoning (Edmonds & Kennedy, 2013). Although mixed methods researchers have struggled to develop a philosophical paradigm, many of them support pragmatism (Creswell, 2014; Johnson & Gray, 2010; Johnson et al., 2007; Teddlie & Tashakkori, 2010). Pragmatist researchers look to the "what" and "how" questions (Cohen et al., 2011; Creswell, 2014; Tashakkori & Creswell, 2007) and this is applied in the main research questions in this study. In generating a theory, the power lies in integrating different approaches, ways of viewing a problem, and types of data (Cohen et al., 2011). To conclude, my positionality as a researcher is primarily one of pragmatism. Thus, I will achieve my goals by using multiple methods, different assumptions and different forms of data collection and analysis.

As this is basically an exploratory study which adopts empirical procedures to generate acceptable answers to the research questions, the research methodology to be adopted is a mixed methodology approach with qualitative and quantitative components and with tradition of structural equation modelling (SEM). As my philosophical position is pragmatism, this affects my research design. In order to gather reasonable answers to my research questions, I used mixed methods triangulation in an ordered sequence. The methodology is qualitative as well as quantitative approaches and my choice of data collection methods is the semi-structured interview and questionnaire. I will use mixed methods as they will provide better understanding of the research problem (Creswell, 2014). For data analysis, methods of descriptive, factor analysis, structural equation modelling (SEM) and thematic analysis will be used in the research.

3.2.3 Summary

I adopted the pragmatist paradigm as it has positive virtues and reflects my view of the world. A mixed methods approach is adopted to generate acceptable answers to the research questions and in order to avoid the issue of researcher bias and methodology design bias.

3.3 The Design of the Study

The term research design refers to the plan or strategy of investigation used in order to obtain answers to research questions or find solutions to a problem (Kumar, 1999; Oppenheim, 1992). This study uses an exploratory sequential mixed methods design, which involves collecting qualitative data based firstly on the literature review and secondly from student interviews. The information is then analysed and the findings used to develop the model and a psychometric instrument (Creswell & Clark, 2011; Creswell, 2014; Flick, 2009; Harrell & Bradley, 2009). This instrument (the

online questionnaire) is then administered in the second (quantitative) phase of the study to a different sample of the population (Creswell, 2014; Wisdom & Creswell, 2013) to test and validate the model using a relational survey design. The purpose of a relational survey is to explore the associations between particular variables (Oppenheim, 1992). Finally, qualitative data is gathered in the third phase (Creswell & Clark, 2011) to enrich and assess the results (Flick, 2009) with different perspectives.

There are strengths and challenges in using exploratory sequential mixed methods design. The strengths are that the researcher can develop a theory and produce a new instrument as potential products of the research process, and by using a quantitative component in the second phase of the design, the qualitative approach will be more acceptable to a quantitative-biased audience (Creswell & Clark, 2011). On the other hand, the challenges are that this design requires more time to carry out and needs to consider using a small purposeful sample in the first phase and a larger different sample in the second phase (Creswell & Clark, 2011). In exploratory sequential mixed methods, researchers are interested in following up qualitative findings with quantitative analysis (Edmonds & Kennedy, 2013). Hence, they use the findings from the first phase of qualitative data to help in developing the instrument and a theory (Creswell & Clark, 2011; Edmonds & Kennedy, 2013). Thus, the qualitative phase is often the primary emphasis of the study as it is better to explore qualitatively to learn what variables need to be studied (Creswell & Clark, 2011). This design is useful for developing an instrument, theory or treatment protocol and for identifying important variables (Creswell & Clark, 2011; Edmonds & Kennedy, 2013).

The first phase of this study explores the factors that influence students' motivation and acceptance of tablet use for learning in higher education and develops an online questionnaire by using a qualitative approach based on the literature and then on students' perspectives. Then the second phase validates the model and tests it by using the quantitative approach. The final phase reflects the model by using a qualitative approach from another perspective. As the complexity of this design needs a visual model or diagram to show the flow of research activities (Creswell, 2014) and to highlight the various steps involved in designing a good instrument (Creswell & Clark, 2011), the following figure has been developed to illustrate this (Figure 10).

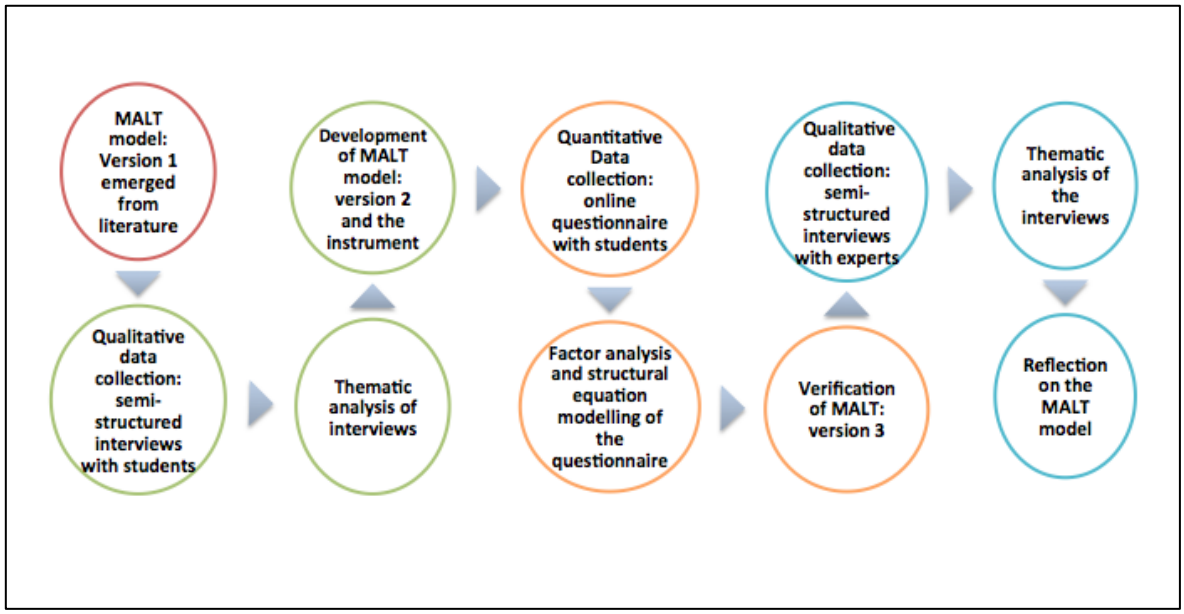

Figure 10 Visual model for the design of the study

3.4 Mixed Methods Research Definition and History

Mixed methods research has various definitions which have emerged over the years (Creswell & Clark, 2011). One of these asserts that mixed methods is a distinct approach to research that is relatively new within the discipline of social and human sciences (Creswell, 2014). It was first used as a new type of methodology around the late 1980s and the beginning of the 1990s and is popular in diverse fields of research such as education, management and health science. Thus, the concepts and methods combining the qualitative and quantitative approaches have been explored and discussed for nearly three decades (Driscoll et al., 2007; Tashakkori & Creswell, 2007). Mixed methods design involves combining qualitative and quantitative research data in a study where qualitative data is gathered from responses to open-ended questions without predetermined responses, whereas quantitative data uses closed-ended questions (Creswell, 2014).

One of the characteristics of the mixed methods approach is that it balances efficient data collection and analysis with data that provides context (ACET Inc., 2013). The use of mixed methods in this design avoids the challenges of using qualitative or quantitative methods alone (Creswell & Clark, 2011). Moreover, the core characteristics of well-designed mixed methods research are the qualitative and quantitative methods of data collection and data analysis procedures. Data are then integrated in data collection, analysis, and/or discussion, using procedures that apply qualitative and quantitative components either concurrently or sequentially (Creswell, 2014), with the same sample or with different samples (Wisdom & Creswell, 2013). The mixed methods approach can thus provide more concrete answers to research questions (Heyvaert et al., 2011). Mixed methods

encourages researchers to use multiple worldviews or paradigms (Creswell & Clark, 2011). Also, integrating qualitative and quantitative approaches can confirm or refute a theory to a greater degree than either one approach (Heyvaert et al., 2011). In addition, mixed methods research can increase the accuracy of the data and provide a more complete picture of the phenomena (Cohen et al., 2011). It is considered to be practical in that researchers are free to use all possible methods in addressing the research problem (Creswell & Clark, 2011).

It must be admitted that mixed methods research is not the answer for all research problems or all researchers (Creswell & Clark, 2011). One of the challenges of a mixed methods approach is to ensure that the two data collection methods complement but do not duplicate each other (ACET Inc., 2013). In other words, the participants should not be asked the same questions in the interview as in the questionnaire. On the other hand, asking the same questions in interviews as in questionnaires can be used as a way of validating the findings (Creswell, 2014; Wisdom & Creswell, 2013). The mixed methods approach is complex to plan and conduct (Wisdom & Creswell, 2013) but it is useful to develop some kind of visual representation of the sequence of steps (Creswell, 2014). Conducting mixed methods research often requires a team of researchers (Wisdom & Creswell, 2013) with particular skills and resources and plenty of time (Creswell & Clark, 2011). The mixed methods approach used in this study employs qualitative and quantitative approaches to the research questions, two kinds of data collection procedures (semi-structured interview and questionnaire), two forms of data (numerical and textual), two types of data analysis (statistical and thematic), and two kinds of conclusions (objective and subjective) (Tashakkori & Creswell, 2007).

3.4.1 Rationale for the Choice of Mixed Methods Research

There are a number of reasons why mixed methods research has been chosen for this study. Firstly, using mixed methods can generate a better understanding in validating the proposed model of the study (Greene, 2007). Secondly, the research deals with both the human and the abstract factors that influence tablet use for learning by students in higher education, and so mixed methods are used in order to adequately address both areas. In looking at the human factors involved, qualitative methods are the more appropriate, while the abstract factors and the relationship between factors are better approached using quantitative methods. Therefore, the integration of quantitative and qualitative data in the form of a mixed methods approach has great potential to strengthen the rigour of the study and to enrich the analysis and findings of the research (Wisdom & Creswell, 2013). Thirdly, mixed methods are used here because in the development of a model for the factors that influence students' motivation and acceptance of tablet use for learning, the students' and experts' views and opinions are crucial. The interview is therefore used here as an effective way to gather this data. Then a questionnaire is designed in order to validate the model

and to develop a validated metric measurement. Fourthly, depending on the research questions, quantitative and qualitative data are used to answer them. Fifthly, mixed methods are used here as I am considered to be an insider in the study context. As Morse points out, "It is not wise for an investigator to conduct a qualitative study in a setting where he or she is already employed and has a work role" (Morse 1998:61). Finally, as none of the methods of data collection alone provides 100% accurate and reliable information (Kumar, 1999), the mixed methods approach has been chosen because of its strength in drawing on the advantages of the qualitative and quantitative approaches. The limitations of each have been minimised in order to reduce bias and reach more accurate conclusions (Cohen et al., 2011). It is considered as the reasonable approach as the researcher has access to both qualitative and quantitative data and it provides a complete understanding of the research problem and questions (Creswell, 2014).

3.5 Methods

Research methods are the tools used to gather the data (Dawson, 2006; Oppenheim, 1992). The choice of methods depends on the purpose of the research, the research questions, the resources available and the skills of the researcher (Arksey & Knight, 1999; Kumar, 1999). In this study, two types of data are collected to answer all research questions. They are both forms of primary data that are collected through semi-structured interviews and questionnaires. These two methods are useful ways of gathering respondents' views and opinions and are a means of exploring their world, especially with regard to the relationship between attitudes, mentality and motivation (Arksey & Knight, 1999).

Although the interview differs from the questionnaire in the level of structure placed on the interaction (Harrell & Bradley, 2009) it might be better to complement the questionnaire with the interview (Arksey & Knight, 1999), as the questionnaire is a good way of checking the strength of the story that the interview seem to contain and it can also be useful for checking the interpretation of the interview data and as a way of exploring how widely views and understandings are shared (Arksey & Knight, 1999).

3.5.1 Interview

The interview is a widely used data collection method (Cohen et al., 2011; Judge et al., 2000; Kumar, 1999; Macan, 2009) and features strongly in everyday media, e.g. television, newspapers, YouTube, and blogs (Lichtman, 2014). Qualitative interviewing is undoubtedly a flexible and powerful tool with which to capture subjective viewpoints and to gather information on ways individuals make meaning out of their experiences and express their opinions (Rabionet, 2009). The word 'interview'

means an interchange of views between two or more people (Cohen et al., 2011). In other words, it allows interviewees to express their opinions, attitudes and perceptions from their own points of view (Arksey & Knight, 1999; Harrell & Bradley, 2009; Zohrabi, 2013). Cohen et al. (2011) have defined the research interview as a conversation between two people which is initiated by the interviewer for the specific purpose of obtaining research information. Lichtman (2014) defined individual interviewing as one of a class of methods that permit the researcher to engage in a conversation with a respondent that is directed by the researcher and serves a particular purpose. Interviews are considered as discussions and are usually one-to-one between an interviewer and a respondent to gather information on a certain topic. The interview differs from the questionnaire in the level of structure placed on the interaction (Harrell & Bradley, 2009). However, it might be better to complement the questionnaire with the interview (Arksey & Knight, 1999). The interview gives the participants the opportunity to respond in their own words and to express their own personal perspective and to understand the cognitive process (Patton, 2002).

The core characteristics of the interview are that it enables more depth of information to be gathered, since questions can be explained. It also enables more difficult and open-ended questions to be asked than other data collection methods (Cohen et al., 2011; Kumar, 1999). Thus the interviewer can probe, establish rapport and assess what the interviewee really believes (Arksey & Knight, 1999; Cohen et al., 2011; Kumar, 1999; Lichtman, 2014; Zohrabi, 2013). One of the purposes of the exploratory interview is to develop ideas and research hypotheses as opposed to simply gathering facts and statistics. Although the interview is considered as a powerful and flexible tool (Arksey & Knight, 1999; Cohen et al., 2011), there are a number of limiting issues. For example, interviewing can be generally very time-consuming, the interviewer can be the cause of bias, some interviews may be problematic for interviewees, some may refuse to be interviewed, and anonymity may be difficult (Cohen et al., 2011; Judge et al., 2000; Kumar, 1999; Zohrabi, 2013).

The semi-structured interview is chosen as a method of data gathering for this study because it is not possible to observe people's feelings, thoughts, intentions and opinions as such, and so it is necessary to ask directly in order to find out participants' perspectives (Arksey & Knight, 1999; Patton, 2002; Zohrabi, 2013). The second reason for choosing the semi-structured interview is that I intend to elicit the themes from the respondents that are most related to the research questions (Rabionet, 2009). Thus, the semi-structured individual interview has been chosen as a primary data collection method in the first phase of the study to gather information and explore what the students perceive are the factors that influence their acceptance and motivation to adopt the use of tablets in their learning. This method will be used again at the end of the study, this time with a sample of experts in technology acceptance model (TAM), in order to reflect on the proposed model.

In planning the semi-structured interview, a general set of guide questions and format are developed which are to be followed with all of the participants. However, the interviewer can vary the questions in order to probe more deeply for relevant information (Lichtman, 2014; Patton, 2002). This approach has been chosen because I feel more confident when there is a guide to follow, but at the same time this guide will not limit participant responses and is easy to transcribe.

3.5.1.1 Designing the Interview

Before conducting interviews, researchers need to design an interview schedule, which is a list of questions or topics to be covered (Dawson, 2006). Interview questions should be structured so that they will elicit the information which the researcher has set out to find. According to Cohen et al. (2011), before writing the questions, researchers need to determine the variables of the study that are to be measured. In order to minimise bias, the structure of the questions needs to be carefully thought out. Thus the interview schedule starts with indirect questions and continues with direct questions. Moreover, prompts and probes are also considered in the framing of the questions to encourage richness and depth of response as well as honesty. The prompts allow the interviewer to clarify the questions, especially if the interviewee seems not to understand, while probes allow the interviewer to ask the interviewee to explain, add to and provide more details (Cohen et al., 2011; Dawson, 2006). As Cohen et al. (2011) mention that it is better to have shorter questions and longer answers from the respondents.

Good questions should be open-ended, neutral and clear (Patton, 2002). The interview questions have been developed to focus on the research topic (Dawson, 2006). In the first phase, the questions are in a specific order according to the answers. In other words, if a particular question receives the answer 'No', a different set of following questions is asked than if the answer is 'Yes' (see Appendix C.1). The translation of the students' interview has been accredited by a special translation committee (see Appendix C.2). In the second phase, there are four main questions (see Appendix C.3). The translation of the data in this phase has been revised by one of the English teachers who is mother tongue is Arabic (see Appendix C.4).

3.5.1.2 Conducting the Interview

Before conducting the interview, there are a number of protocols that researchers must follow (Harrell & Bradley, 2009; Rabionet, 2009). I inform the interviewees of the purpose, nature, duration and ethical issues of the interview. This is done in order to maintain honesty without risking biased responses. The interviewer must strive to make the participants feel comfortable and inform them adequately about what will happen during and after the interview. Confidentiality, anonymity and the consent form should be discussed (Cohen et al., 2011; Dawson, 2006; Harrell &

Bradley, 2009; Kumar, 1999) and the researcher should clarify that there are no right or wrong answers and obtain clear permission for recording (Dawson, 2006). At the beginning of the interview, I establish rapport, putting myself in the interviewees' shoes and being careful to maintain an attitude of neutrality (Cohen et al., 2011; Patton, 2002; Rabionet, 2009; Thomas, 2013). The ways to establish a rapport include treating the interviewees with respect, body language and eye contact (Dawson, 2006). The researcher must develop a rapport with the interviewees by adopting a relaxed, accepting and non-judgmental attitude (Cohen et al., 2011; Dawson, 2006). The respondents can also feel more comfortable if we share some of our stories with them but not about the research topic; this has the effect of removing potential power differences and helps to yield meaningful and relevant data (Lichtman, 2014).

During the interview, the interviewer should not reveal his/her own biases and values and should avoid being judgemental, pay attention to the dynamics of the interview so that the conversation is maintained and the interviewees are motivated to discuss their opinions and demonstrate interest, listen more and speak less, avoid giving signs of agreement or disagreement, and be prepared to repeat the questions if necessary (Cohen et al., 2011). I should be prepared to move to another question if an interviewee seems unwilling to answer, keep the interview going, consider my own non-verbal communication, give the respondents time to think. Finally and importantly, the interviewer should remember to thank the participant at the end of the interview (Cohen et al., 2011; Dawson, 2006; Harrell & Bradley, 2009; Patton, 2002).

The interviews are recorded using voice-memo software on a smartphone. This software makes a smartphone easier and more reliable to use in recording, and files can be sent directly to the laptop (Lichtman, 2014). Audio recording is recommended over all other methods when interviewing (Arksey & Knight, 1999; Dawson, 2006; Rabionet, 2009). Although interviews are recorded, this does not mean that the researcher should not take any notes (Dawson, 2006; Patton, 2002). It is in fact useful to take strategic and focused notes as these help to identify key phrases and important quotations, and to list major points (Arksey & Knight, 1999). Notes can also serve as a backup source in the event of lost or unclear recordings (Rabionet, 2009). Taking notes may influence the interview (Cohen et al., 2011), although Patton (2002) has argued that if notes are not taken, it may indicate to the respondents that nothing of importance is being said. Hence, taking notes during the interview is kept to a minimum and includes the main points and some non-verbal communications.

After the interview, the recording is checked and everything that can be remembered is noted along with reflections on the interview information quality (Dawson, 2006). Thus the data is more likely to be useful and reliable (Harrell & Bradley, 2009; Patton, 2002).

3.5.1.3 Piloting the Interview

3.5.1.3.1 Students' Interview

Consultation with experts in the field and experienced qualitative researchers is a useful way of providing feedback and guidance (Rabionet, 2009). Thus, before piloting the interview with students, I obtained two qualitative experts' opinions on the questions, which resulted in a number of changes being made. The advice was that the language of the questions needed to be simpler, some of the questions needed to be shorter, and others should be changed completely because they revealed my values. It is important to avoid leading questions and also to make sure that the questions motivate the participants to give answers. I changed the wording of the questions according to the feedback given.

The first interview was subsequently piloted with two participants from the sample to help improve the interview schedule (Rabionet, 2009) and allow familiarisation with the recording equipment (Dawson, 2006). It became clear that some terms like *mobile learning* and *tablet* have two different Arabic translations and while they are both correct, one is more common than the other. I amended the terms to reflect the most common usage. Two more questions were added to the interview, "Do you own any kind of technology device? If yes, what is it?" and "How can you access the internet?". The first question asks for important information about the participants and the second one investigates more about the ways in which they are able to access the internet. This trial run also gave a realistic indication of how long the interviews would take to conduct.

3.5.1.3.2 Experts' Interview

Before conducting the third phase of interviews with TAM experts, a qualitative expert was consulted on the question formulation, which resulted in a change being made. The advice was that the order of the questions needed to be changed, and so this was altered according to the feedback. The revised interview was subsequently piloted with one participant from the sample to help improve the interview schedule. It became clear that some terms needed to be explained in detail, and so this was addressed. This trial run also gave a realistic indication of how long the interviews would take to conduct.

3.5.1.4 Analysis of the Interviews

Thematic analysis is used to analyse the interviews based on the steps of Braun & Clarke (2006). Deductive and inductive thinking strategies are adopted when analysing the interviews. More details are given in the chapter dealing with the first phase (Chapter 4:) and an example of the interview analysis is in Appendix C.5.

3.5.2 Questionnaire

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

The advantages of the questionnaire method are that it is less expensive, offers anonymity (Cohen et al., 2011; Kumar, 1999) and tends to be quicker and easier to code (Dawson, 2006). The drawbacks of using this method include low return rates, lack of opportunity to clarify the meaning to respondents (Cohen et al., 2011; Kumar, 1999) and predefined answers which may not match actual opinions (Dawson, 2006). The questionnaire method can be used to collect data on attitudes (Dawson, 2006; Thomas, 2013) and thus is a suitable metric (measurement instrument) as this study investigates the attitudes and perceptions of people (Arksey & Knight, 1999). Another reason for choosing this instrument is that it is a relatively systematic and standardised method of collecting data which lays emphasis on the measurement and conversion of data from qualitative to quantitative forms.

3.5.2.1 Closed and Open-ended Questionnaire

Closed questions suggest the range of responses from which the respondents may choose and are useful in that they can generate frequencies of response which are amenable to statistical treatment and analysis. They are also quicker to code and analyse, and are directly to the point. However, they do not enable respondents to add any remarks, qualification or explanation to the categories (Cohen et al., 2011). On the other hand, open-ended questions enable participants to write a free account on their own terms and to explain and qualify their responses, although this can lead to the accumulation of irrelevant data and may require more time from respondents and researchers when coding and analysing (Cohen et al., 2011). It is useful in this case to provide some kind of support for respondents. Open questions are therefore useful if the questionnaire is exploratory or if the possible answers are unknown.

The questionnaire used in this study consists of mostly closed questions; however, open questions are also used towards the end to investigate why some HE students do not use any mobile devices

in their learning. They were also used in case the factor analysis did not run correctly, which occurred in the initial questionnaire.

3.5.2.2 Questionnaire Design and Development

In developing a questionnaire, the researcher needs to bear in mind the characteristics of the respondents and take into account the fact that the meanings of the questions cannot be explained, thus the questions need to be carefully formulated for clarity and ease of comprehension (Cohen et al., 2011; Kumar, 1999). The questionnaire should therefore be short, simple, and start with easy questions to motivate the respondents to complete it (Dawson, 2006). Moreover, the layout should make it easy to read and pleasant to the eye, and the sequence of the questions should be easy to follow (Cohen et al., 2011; Kumar, 1999).

Certain points to watch when designing the questionnaire include avoiding double-barrelled questions and double negatives, evaluating the "Do not know" and "Not Applicable" categories because they are often omitted or used too much, using simple words, and being aware of leading questions (Cohen et al., 2011; Oppenheim, 1992). Moreover, the questionnaire should include instructions for the respondent, especially in a self-administered questionnaire.

The study of attitude has a long and complex history in social psychology. An attitude statement is "a single sentence that expresses a point of view, a belief, a preference, a judgment, an emotional feeling, a positing for or against something" (Oppenheim, 1992:174). After studying the literature, researchers must begin with an in-depth interview, the main purpose of which is to explore the origins and complexities of the attitude areas in order to decide what requires further measurement and to obtain vivid expressions of attitudes from the respondents in a way that makes them suitable for use in an attitude scale (Oppenheim, 1992). Attitudes are essentially emotional tendencies, and so some of the more contentiously worded opinions should be selected from the in-depth interviews (Oppenheim, 1992). In the attitude scale in a questionnaire, respondents are asked to agree or disagree.

I followed some of the guidelines of scale development when developing the main questionnaire (Devellis, 2003). The steps of the guidelines are as follows:
Step one is to determine clearly what needs to be measured. The phenomena measured in social science research are often derived from theory, which then plays a vital role in the development of measurement scales (Devellis, 2003). Thus, theory is a great aid to clarifying the parameters of measurement. Scale development can be used when there are no appropriate existing instruments (Devellis, 2003). For this research, there is an existing tool for some of the factors but not all of them. New scales need to be designed and organised to meet the requirement of this research.

Step two is to generate an item pool (Devellis, 2003). The items are selected or created based on technology acceptance measurements. The selected items reflect the latent variables underlying them. There is no specific number of items that should be included in an initial pool; however, the larger the item pool, the better. Thus, developers need to write the items (Devellis, 2003), which is often the most difficult part of developing the questionnaire. To tackle this, developers need to begin with statements that are paraphrased from the measured construct. Further statements are generated that express the same idea but in a different way. There are good and bad items and also positively and negatively worded items. The simpler items are short and include short words. After that, factor analysis can be used to assess whether that selection process succeeded.

Step three is to determine the format for measurement (Devellis, 2003). There are many questionnaire formats and one including a neutral option may be desirable. One of the most common formats for items is the Likert scale (Devellis, 2003). Good Likert items include opinion, attitude, or belief, knowledge and awareness questions which are referred to as non-factual questions (Ball, 1977; Oppenheim, 1992). This kind of response scale provides a wider range of possible scores and also increases the statistical analyses that are available (Boone & Boone, 2012; Pallent, 2005). The questionnaire of this study comprised a closed Likert scale, dichotomous questions, and three open questions (Appendix D.2). In addition, one of the questions used a frequency scale (i.e. always, frequently, sometimes...) and another used a qualitative scale (i.e. good, fair, poor). A Likert scale with seven choices was used in the main questionnaire, where 7 = strongly agree, 6 = moderately agree, 5 = agree, 4 = neutral, 3 = disagree, 2 = moderately disagree and 1 = strongly disagree. According to Krosnick and Presser (2010), scales composed of between five and seven are preferable in order to maximise reliability and validity. In this study it was decided to use seven options which includes the neutral option for those who wanted to express this, as well as to add to participant satisfaction and improve the reliability and validity of ratings (Cohen et al., 2011; Krosnick & Presser, 2010). The questionnaire features an attitudinal scale which measures attitudes towards an issue (Cohen et al., 2011; Dawson, 2006; Kumar, 1999). The Likert scale is used, which is the most common and easy to construct and more suitable for the factor analysis. Participants are biased towards the left-hand side of the scale (Cohen et al., 2011) as the most frequently chosen answers lie to this side. To counteract this, items should be mixed so that some of them score positive on the right and some of them score negative on the left (Cohen et al., 2011). However, I followed the technology acceptance questionnaire, which does not use any negative statements. Cape (2016) found no statistically significant differences in an experiment in which one group read the ‘strongly agree’ scale from right to left and the other from left to right. There was only a slight increase in time taken when the scale was presented disagree-agree rather than agree-disagree.

Step four is to ask experts to review the initial item pool; the experts being a group of people who are knowledgeable about the topic (Devellis, 2003). This can confirm the definition of the phenomena. In this study, five experts were asked to rate how relevant they think each item is to what the researcher intended to measure. They evaluated the items' clarity and conciseness. Step five is to administer items to some of the study participants (Devellis, 2003). Step six is to evaluate the items (Devellis, 2003). After an initial pool of items has been developed and tested using an appropriately large sample, the performance of the individual items is evaluated so that appropriate items can be chosen for inclusion in the scale (Devellis, 2003). This is the most important part of item development. The higher the correlation between items, the higher are the individual item reliabilities. If the correlations with other items are negative, developers need to reverse the score. The high variance is also important. Some items may have no common underlying variable or they may have several variables. This is vital and can be done by factor analysis (described in the analysis of the questionnaire and in more detail in Chapter 5: Cronbach's alpha is one way of evaluating how successful the research developers have been. Devellis (2003) suggests the following scores for alpha, in which below .60 is unacceptable, between .60 and .65 is undesirable, between .65 and .70 is minimally acceptable, between .70 and .80 is respectable, between .80 and .90 is very good and if much above .90, the scale needs to be shortened.

Step seven is to optimise scale length (Devellis, 2003; Johnson & Morgan, 2016). A scale alpha is influenced by two characteristics: the extent of co-variation among the items and the number of items in the scale. If a scale's reliability is too low, then shortness is no virtue (Devellis, 2003). Subjects may, indeed, be more willing to answer a 10-item than a 50-item scale, especially students. However, if the researcher cannot assign any meaning to the scores obtained from the shorter version, then nothing has been gained. Effects of dropping "bad" items actually increases or decreases alpha and this depends on just how poor the items are that will be dropped, and on the number of items in the scale. Thus, it is usually better to drop those items first which have the least negative or most positive effect on alpha. If there is very large sample (eg. N=<600), the researcher can split it into two subsamples. One can serve as the primary development sample, and the other can be used to cross-check the findings (Devellis, 2003).

There are different ways of administering the questionnaire, for example by mail or by collective or public space administration (Kumar, 1999). The questionnaire can be self-administered by participants away from the researcher or administered by the researcher with the researcher present (Dawson, 2006). However, according to Cohen et al. (2011), both of these methods are considered self-administration, one with the presence of the researcher and the other without. Although the presence of the researcher can be helpful, ensure a good response rate, and make

the process quicker, having the researcher present could also be threatening and the respondents may feel uncomfortable (Cohen et al., 2011). The method chosen here for the online questionnaire is self-administration without the presence of the researcher.

Preparing the questionnaire entails the following stages: a literature review, interviewing students in higher education, questionnaire development, experts review and pilot testing of the questionnaire. At the beginning of the questionnaire a cover sheet is included to explain the purpose of the research and the basis of participant selection. This also serves to introduce the researcher and give contact details; provides assurance of anonymity, confidentiality and non-traceability; and thanks respondents in advance for their cooperation (Cohen et al., 2011). Administering the questionnaire in a different country and using a different language creates more complexity (Iarossi, 2006); however, I translated the initial questionnaire and then had it accredited by a special translation committee (Appendix D.1). For the main questionnaire, I collaborated with two English teachers whose mother tongue is Arabic to correct and amend the translation (Appendix D.3).

3.5.2.3 Piloting the Questionnaire

Piloting can help researchers and investigators to not only with the wording of questions but also with procedural matters such as the design of a letter of introduction, the ordering of the question sequences and the reduction of non-response rates, which are important especially if self-completion questionnaires are used (Oppenheim, 1992). Consultation with experts in the field and experienced quantitative researchers is a useful way of providing feedback and guidance (Rabionet, 2009). It is a mistake to assume that researchers know in advance how respondents will react, and it is not good if researchers rely only on experts. Consulting experts and piloting can help in the translation of the questionnaire from one language to another (Oppenheim, 1992).

Researchers need to pilot-test the questionnaire first using some of the same sample that will be used in the main study to ensure that the instructions, questions, and scale items are clear and also to ensure that the respondents can understand the questionnaire items and respond appropriately. A pilot is also useful to identify any questions that may offend the respondents and which should be cut from the final version (Pallent, 2005). The pilot study will be the first live test of the questions (Iarossi, 2006). It is important in that it determines the accuracy and quality of the data and collects feedback on the validity and length of the questionnaire (Cohen et al., 2011; Iarossi, 2006).

Since part of the questionnaire is derived from existing questionnaires used in different settings and contexts and another part was developed according to the interview results, exploratory and

confirmatory factor analyses will be run (Cohen et al., 2011). The factor analysis will be used to reformulate the questionnaire with the most appropriate number of indicators for data collection.

I consulted five people with expertise in either questionnaire design or TAM. The TAM expert suggested matching the themes with those in the technology acceptance models and it was found that all of the themes matched except willingness, mobility and achievement. It was also suggested that the theme of identity be changed to image. The experts in questionnaire design advised that I should "tell participants about the repeated items", "try to get qualitative data in case the factor analysis does not work", "keep it clear and focused", "use graphics" and "change some items as they do not relate to the factors". It was also suggested that, "when translating the questionnaire, you need two Arab-speaking English teachers to validate the translation". Two of the TAM experts suggested to "not include the four items of 'actual usage' separately, but to put them in a frequency scale with no need to repeat them, as once is enough, and as the tablet is not yet implemented in the study context, the more there is a need to study intention rather than actual usage". The advice was followed as far as practicable and so some items were changed, qualitative questions were added to the questionnaire and the Arabic translation was checked by two Arabic teachers of English, who also suggested a few changes in terminology.

I subsequently piloted the questionnaire informally with two students from the sample and noted that the repetition of some questions was considered boring and so these were changed to emphasise their differences. The pilot student answered the questionnaire in about seven minutes. I found that participants would not be able to see all seven Likert options when using a smartphone and added a note that "participants should either rotate the smartphone or expand the options".

3.5.2.4 Analysis of the Questionnaire

This study used a factor analysis approach to analyse the data of the questionnaire as well as structural equation modelling. Thematic analysis has been used in analysing the open-ended questions.

3.5.2.4.1 Factor Analysis (FA)

FA "consists of a number of statistical techniques, the aim of which is to simplify complex sets of data. In social science, factor analysis is usually applied to correlations (matrices) between variables" (Kline, 1994:3). It is an analytic statistical tool which can be used to discover the main underlying dimensions of a set of variables, attributes or responses (Oppenheim, 1992). According to Cohen et al. (2011) FA is a method of grouping together variables that have something in common and is a process by which the set of variables is reduced. It refers to group of statistical

procedures which are designed to determine the number of different constructs assessed by group of measures. These unobservable constructs are referred to as common factors (Fabrigar & Wegener, 2011). The definitions of some of the concepts relating to FA are given in Appendix E Table 23.

Correlations, variance and covariance are important in order to understand FA (Kline, 1994). FA can be used when investigators want to know how many constructs a group of measured variables is assessing and what these constructs might be, but they are not yet at a point at which they want to test specific hypotheses about how the constructs might be causally related (Fabrigar & Wegener, 2011). FA is started by creating a correlation matrix, which is followed by a principle component analysis. However, this is not the final stage if there is a lack of meaning or if there are difficulties in interpretation. Different procedures have been developed to help investigators identify and interpret the underlying dimensions they may find (Oppenheim, 1992). This will require factor analysis "rotation" in which a number of attempts (called "iterations") are made to re-draw the factor loadings in such a way as to produce a more meaningful result (Devellis, 2003).

Types

There are two types of factor analysis. One is exploratory factor analysis (EFA) and the other is confirmatory factor analysis (CFA). The former can be used when the researcher has few or no clear expectations about the underlying structure of correlations, whereas the latter can be used when the researcher has clear predictions about the number of common factors and the specific measures each common factor will influence (Fabrigar & Wegener, 2011).

Exploratory Factor Analysis (EFA)

EFA can be used to determine the underlying structure of factors. The aim of it is to explore the field or to discover the main constructs or dimensions (Kline, 1994). It was first developed by Spearman in 1904. Unfortunately EFA can produce confused or misleading results, leading some psychologists to reject it in favour of CFA (Kline, 1994). EFA can only suggest structures and does in fact require CFA as a second step (Kline, 1994). It is mainly well suited to two general types of research questions which are construct identification and measurement instrument construction (Fabrigar & Wegener, 2011). In EFA, the Kaiser-Meyer-Olkin (KMO) test which measures sampling adequacy value needs to be checked first, followed by factor extraction in which a choice is made between principal component analysis, principal axis or maximum likelihood. Maximum likelihood has the same mathematics of structural equation modelling. However, in a larger sample, there is no difference between maximum likelihood and principal component analysis. Principal component analysis is one method of considering a matrix of correlations and explains all the variance in any

particular correlation matrix, including the error variance (Kline, 1994). It can be used if researchers want an empirical summary of the data set. Moreover, it is a well-known method of extraction in EFA and is widely-used. In social science research, the aim of FA is to explain the observed correlations and this means that the factors must be interpreted and identified (Kline, 1994). When factor extraction done, it is necessary to do factor rotation in order to make the result more meaningful. In other words, it is clear that rotating factors can change the factor loadings and also their meanings. There are two types of rotation, the orthogonal, in which the factors are uncorrelated and the oblique, in which the factors are correlated.

Confirmatory Factor Analysis (CFA)

CFA is done to "confirm a particular pattern of relationships predicted on the basis of theory or previous analytic results" (Devellis, 2003:118). It is used to test hypotheses (Kline, 1994). It is clear that CFA can be of value in confirming hypotheses but much depends on the sample size and the indices of model fit. It is referred to as a measurement model in structural equation modelling. The structural model examines relationships between the latent variables, which can test complex psychological hypotheses (Kline, 1994). EFA is often used in the early stages of research to gather information about or to explore the interrelationships between a set of variables, whereas CFA is a more complex and sophisticated set of techniques used late in the research process to test or confirm certain hypotheses or theories concerning the structure of underlying groups of variables (Pallent, 2005). More details about both types are given in Chapter 5:

Justifications for choosing FA in analysing the questionnaire findings

This study used the analytic, relational survey design in order to explore the associations between particular variables (Oppenheim, 1992). Thus, FA is reasonable for this type of survey design. In order to not reach erroneous conclusions about a theory by misinterpreting what a scale measures (Devellis, 2003), FA has been used. Moreover, FA is a worthwhile analytic tool that can identify important properties of a scale. Therefore, it helps in determining empirically how many constructs (latent variables) underlie a set of items (Devellis, 2003). Additionally, FA is well-known tool for theoretical investigation, new discoveries and test construction (Kline, 1994). As a result, FA is an essential tool in scale development. It allows the data analyst to determine the number of factors underlying a set of items. In addition, one of the contributions of this study is to validate the instrument in which a number of new items are constructed. FA is used widely in scale development either to refine and reduce items to form a smaller number of comprehensible subscales or to reduce a large number of related variables to a more reasonable number (Pallent, 2005).

3.5.2.4.2 Structural equation modelling (SEM)

Structural equation modelling (SEM) is a "multivariate technique combining aspects of factor analysis and multiple regression that enables the researcher to simultaneously examine a series of interrelated relationships among the measured variables and latent constructs as well as between latent constructs" (Hair et al., 2010:634). SEM examines interrelated relationships among multiple dependent and independent variables (Cohen et al., 2011; Hair et al., 2010). Therefore, SEM was the most suitable for this study as it involves multiple independent-dependent relationships to test the goodness of model fit and to verify the model and the relationships between the factors.

In this research, factor analysis and structural equation modelling are carried out. The second-generation statistical technique of structural equation modelling (SEM) is used, using the Analysis of Moment Structures (AMOS) software, v.24. This includes the measurement model and structural model. Based on the model testing results, the relationships between the research variables of interest are tested. The reasons for selecting SEM for data analysis were that it offers a systematic mechanism to validate relationships between factors and to test relationships between the factors in the proposed model, and also because it offers powerful statistical techniques to deal with complex models (Cohen et al., 2011; Hair et al., 2010; Muijs, 2004) and also considers the measurement error of the model (Muijs, 2004). In SEM, relationships between latent factors and indicators are validated by using confirmatory factor analysis (CFA), also known as a measurement model, and relationships between independent latent factors and the dependent factor are tested using the structural model (Cohen et al., 2011; Hair et al., 2010; Muijs, 2004).

In addition to factor analysis, descriptive statistics are used to analyse the questionnaire data. Descriptive statistics describe the data by providing a summary and by graphical plotting of numerical data (Thomas, 2013; Cohen et al., 2011). Quantitative analysis involves statistical techniques using SPSS to find the kurtosis, skewness, mean, and standard deviation of the data (Cohen et al., 2011).

3.6 Triangulation

Triangulation refers to "the technique where the researcher uses more than one method, object or subject in order to check the robustness of the original data sets" (Burnett, 2009:115). It can be used as a strategy to improve the quality of qualitative research (Flick, 2009). In social science this means, "looking at things from different angles and using different kinds of method" (Thomas, 2013:145). Thus, triangulation ensures that data are obtained from a wide range of sources, using different methods or investigators (Arksey & Knight, 1999; Flick, 2011). There are different kinds of

triangulation: methodological, theoretical, data and investigator triangulation (Arksey & Knight, 1999; Flick, 2009). According to Cohen et al. (2011), triangulation in social science research attempts to explain the richness and complexity of human behaviour by studying it from more than one standpoint and by making use of both qualitative and quantitative data. Thus, I gather different data sets in different ways. Triangulation can be done to check the effectiveness of the chosen sample frame or/and the chosen data collection methods (Burnett, 2009; Greene, 2007). Furthermore, it can help the researcher to reject or be more confident of the explanation or findings of the previous method (Thomas, 2013). Moreover, it prevents the researcher from being misled or affected by outliers or unique cases which would skew the data (Burnett, 2009) and hence may reduce the chances of making errors or drawing inappropriate conclusions (Arksey & Knight, 1999). It might also reduce the bias and strengthen the validity of the study findings (Arksey & Knight, 1999; Greene, 2007). Additionally, by using triangulation, the researcher becomes more confident in the research process (Arksey & Knight, 1999; Cohen et al., 2011). On the other hand, it may also become a rather time-consuming activity (Arksey & Knight, 1999). This study depends on an intensive narrative literature review and collects qualitative and quantitative data from students and qualitative data from TAM experts. Data analysis triangulation is used, which consists of member checking and expert examination.

3.7 Validity and Reliability

Validity and reliability are two factors that should be considered while designing a study, analysing the results and judging the quality of the research (Creswell & Clark, 2011; Golafshani, 2003). The goal of research is to reach valid outcomes based on suitable scientific methods and so validity and reliability are very important for accurate analysis (Edmonds & Kennedy, 2013; Dawson, 2006). An assessment of validity and reliability has been undertaken to ensure that the data collected serves the purpose and is checked for quality.

Validity criteria test and check the quality of the data, results and interpretations (Cohen et al., 2011; Creswell & Clark, 2011; Patton, 2002) in order to demonstrate that the method chosen was the right one for the study task (Burnett, 2009; Kumar, 1999; Thomas, 2013). According to Edmonds and Kennedy, the validity of research design refers to "the extent to which the outcome accurately answers the stated research questions of the study" (Edmonds & Kennedy, 2013:3). If two researchers study the same phenomenon, they may obtain different findings, but both sets of findings can still be reliable (Cohen et al., 2011). Reliability refers to the repeatability of the study, that is to say, if the same methods were used again with the same sample, they would produce the same or similar enough results (Oppenheim, 1992). It is possible to have a measure that has highly

reliability but poor validity, whereas excellent validity indicates reliability (Oppenheim, 1992). Validity methods differ in quantitative and qualitative research (Creswell & Clark, 2011).

3.7.1 The Validity and Reliability of the Interview

Qualitative validity comes from the analysis procedure of the researcher based on the information collected while visiting participants and from external reviewers (Creswell & Clark, 2011). It assesses whether the information gained through the qualitative data collection is accurate and credible (Creswell & Clark, 2011; Creswell, 2007). Although some qualitative researchers have argued that the term validity is not appropriate to qualitative research (Thomas, 2013), they have realised at the same time that there is a need for some kind of qualifying check or measure for their research (Golafshani, 2003). Thus, the trustworthiness of the data, the rigour and quality of the data collection procedures, and the content validity are important to qualitative methods as well (Edmonds & Kennedy, 2013).

Member checking is a well-known approach in which the researcher takes summaries of the findings back to key participants in the study and asks them whether the findings are an accurate reflection of their experience (Creswell & Clark, 2011; Creswell, 2007; Flick, 2009). Another validity approach is triangulation of data drawn from several individuals (Creswell & Clark, 2011; Creswell, 2007), although triangulation can be less a strategy for validating results than an alternative to validation (Flick, 2009). Moreover, another approach is to ask peers who are familiar with qualitative research to examine the data (Creswell & Clark, 2011; Creswell, 2007). Dependability and confirmability are established through auditing of the research process (Creswell, 2007). To report interview findings, researchers need to summarise perspectives, provide quotations, analyse data systematically and in narrative form and provide a unique depth of understanding of the data (Harrell & Bradley, 2009; Lodico et al., 2006). There are biases in the qualitative interviews (Creswell, 2014; Thomas, 2013). These have been reduced as much as possible by asking indirect questions and not showing any signs of approval or disapproval. A number of peers then examined the interview data, and participants checked the summaries of their own responses, and this triangulation has been used to validate the results.

Reliability plays a minor role in qualitative research and has limited meaning (Creswell & Clark, 2011). In qualitative research, validity is emphasised more than reliability in determining whether the account provided by the researcher and the respondents is accurate, can be trusted and is credible (Creswell & Clark, 2011; Flick, 2009). The reliability of the interview can be defined as the fit between what researchers record as data and what actually occurs in the natural setting that is being researched (Cohen et al., 2011). Although Thomas (2013) considers reliability as irrelevant to

the interpretation of qualitative data, qualitative researchers carry out their study in naturalistic settings, which can help to obtain reliable and accurate results (Lodico et al., 2006). The design of the interview is highly structured, with the same format and sequence of words and questions for each participant. Reliability is a consequence of the validity in a study (Golafshani, 2003). It can be enhanced if the researcher obtains the detailed data by employing a good quality recorder (Creswell, 2007). It relates to the reliability of multiple coders to reach agreement on codes for passages in texts (Creswell & Clark, 2011; Creswell, 2007; Flick, 2009) and is increased by interview training for the interviewers and by checking the interview guides or generative questions in test interviews or after the first interview (Flick, 2009). After each interview in this study, the recording was checked and notes were made about everything that could be remembered. Moreover, I made sure that all the participants were asked the same questions and were given similar clarification. Furthermore, I checked the codes of a sample of an interview with a qualitative expert. Additionally, an expert review and a pilot study were done before conducting the interviews.

3.7.2 The Validity and Reliability of the Questionnaire

One of the main issues with regard to the reliability and validity of the questionnaire is that of sampling (Cohen et al., 2011). Quantitative validity means that the scores received from participants are meaningful indicators of the construct being measured. There are three kinds of research design validity in quantitative methods: internal, external and construct validity (Edmonds & Kennedy, 2013). As internal validity does not apply to non-experimental research, it is not taken into account in the current research (Creswell & Clark, 2011; Edmonds & Kennedy, 2013). External validity refers to the extent to which the results can be generalised to the relevant populations, settings or outcomes and can be secured if a random sampling technique is used (Creswell & Clark, 2011; Edmonds & Kennedy, 2013). Construct validity should be applied to all kinds of research and refers to the extent to which a generalisation can be made from the measurement of the theoretical construct to the conceptual basis responsible for the change in the outcome (Creswell & Clark, 2011; Edmonds & Kennedy, 2013). In scale development, “whereas reliability concerns how much a variable influences a set of items, validity concerns whether the variable is the underlying cause of item covariation” (Devellis, 2003:59). Thus, validity is inferred from the manner in which a scale was constructed, its ability to predict specific events, or its relationship to measures of other constructs (Devellis, 2003).

Validity can be expressed as a correlation coefficient, but this is different to the reliability coefficient. There are different methods of expressing validity, based on the type of validity used in the study. The types of validity used in this study are described and defined as follows:

1. Content validity seeks to establish that the items or questions reflect a content domain to be measured (Devellis, 2003; Oppenheim, 1992; Pallent, 2005). It is difficult to use this kind of validity for attitudes and beliefs as it is difficult to determine accurately what the range of potential items is (Devellis, 2003) and also it depends or researcher's judgment (Hair et al., 2010).
2. Construct validity is directly concerned with the links between a set of theoretical assumptions about the relationships between variables; for example, with links to other variables about constructs such as intelligence (Devellis, 2003; Oppenheim, 1992; Pallent, 2005). In other words, the intended measure should be positively correlated with measures of C and D and uncorrelated with measures of X and Y. (Devellis, 2003). This can be achieved of three different kinds of validity which are discriminant, convergent and nomological validity. Discriminant validity indicates the absence of correlation between measures of unrelated constructs (Devellis, 2003). It is the extent to construct is a truly distinct from other constructs (Hair et al., 2010). Convergent validity is "the extent to which indicators of a specific construct share a high proportion of variance in common" (Hair et al., 2010:689). Nomological validity tests the validity that "examines whether the correlation between the constructs in the measurement theory make sense. The construct correlations can be useful in this assessment" (Hair et al., 2010:691).

Larger samples increase the generalisability of the conclusions reached by means of FA. Of course, replicating a factor analysis solution on a separate sample may be the best means of demonstrating its generalisability. In fact, it probably would be useful to replicate the whole factor analytic process on an independent sample to demonstrate that the results obtained were not a one-time chance occurrence (Devellis, 2003).

Reliability refers to the consistency of variables over time and to their internal consistency, which is measured by the alpha coefficient. Attitudinal questions which are considered as non-factual are more sensitive to changes such as wording and emphasis than factual questions (Oppenheim, 1992). It is almost impossible to assess reliability by asking the same question in another form as it almost certainly will no longer be the same question. Therefore, groups of questions are more reliable than single opinion items because they can provide more consistent results, since vagaries of question wording will probably apply only to particular items (Oppenheim, 1992). According to Devellis, scale reliability "is the proportion of variance attributable to the true score of the latent variable" (Devellis, 2003:53).

Reliability can be measured in various ways such as by repeatedly applying the scale to the same sample within a short period; this is called 'test – retest' reliability (Oppenheim, 1992). However,

this may not be valid as it will no longer mean that the same test is given under conditions identical to the first. This can be the case especially in educational technology research, since technology develops very rapidly and participants may quickly lose interest in an obsolete device or piece of software. Therefore, to avoid this kind of problem, the method of internal consistency can be used. This is usually associated with Cronbach's alpha coefficient and its variants. Moreover, the split-half method can be used too (Oppenheim, 1992). All of these produce measures of reliability in the form of correlation coefficients. In the split-half method, the set of items comprising the measure is separated into two halves at random, and the two halves are then intercorrelated (Oppenheim, 1992). This method can be used if the sample size is more than 600 (Devellis, 2003).

This study used the internal consistency method to test reliability. Internal consistency reliability is concerned with the homogeneity of the items within a scale. Although the link between items and latent variables cannot be directly observed, it can certainly be determined whether the items are correlated to one another (Devellis, 2003). If the scale is measuring a single underlying continuum, then the items should have strong relationships with that continuum as well as with each other. Coefficient alpha gives an estimate of the proportion of the total variance which is not due to error; this represents the reliability of the scale (Oppenheim, 1992). The reliability of the Likert scale tends to be good (Oppenheim, 1992) partly because of the greater range of answers given by respondents. Internal consistency examines the covariance matrix of a set of a scale items. A covariance matrix for a set of scale items describes important information about the scale as a whole (Devellis, 2003).

According to Devellis, alpha needs to be examined for various reasons. First, it is widely used as a measure of reliability. Second, its connection to the definition of reliability may be less self-evident than is the case for other measures of reliability. Finally, an exploration of the logic underlying the computation of alpha provides a sound basis for comparing how other computational methods capture the essence of what is meant by reliability. As a result, alpha gives a measure of how much variance a group of items has in common. If alpha is low, searching for subsets of items that correlate strongly with each other is necessary (Devellis, 2003).

Internal consistency is typically equated with Cronbach's coefficient alpha (Devellis, 2003). Different levels of reliability are needed depending on the nature and purpose of the scale (Pallent, 2005). Nunnally (1978) as cited in Pallent (2005) recommends a minimum level of .7. Cronbach alpha values, depending on the number of items in the scale. Checking for the reliability (internal consistency) of a scale is essential in survey research, particularly in studies that involve the use of scales to measure personality characteristics such as attitudes, beliefs and opinions (Pallent, 2005).

3.8 Sampling

3.8.1 The Sample Criteria

The quality of research is not only judged by the suitability of the methodology but also by the appropriateness of the sampling (Cohen et al., 2011). It is important to identify the individuals from whom the researcher plans to collect the data (Edmonds & Kennedy, 2013; Kumar, 1999). Sampling refers to the process of choosing a few (a sample) from a large group (the sampling population) to become the source for estimating or predicting facts and outcome regarding the larger group (Dawson, 2006; Kumar, 1999). In social science research, the unit of analysis is at the individual or at the state level (Edmonds & Kennedy, 2013). The sample for this study was a group of undergraduate students from King Abdulaziz University (KAU) in Saudi Arabia and Saudi experts in technology acceptance model research.

The two sampling techniques are probability and nonprobability (Cohen et al., 2011; Edmonds & Kennedy, 2013). There are five types of probability sampling: simple random, cluster, stratified, systematic and multistage sampling, whereas there are just two types of nonprobability sampling: convenience and purposive sampling (Edmonds & Kennedy, 2013; Kumar, 1999; Thomas, 2013). Purposive sampling has been used in the qualitative phase whereas simple random sampling has been used in the quantitative phase of data gathering (Edmonds & Kennedy, 2013) to ensure that the sample is representative of the selected population (Thomas, 2013). Moreover, the participants in the qualitative phase should be different to those taking part in the quantitative phase, as the latter aims to generalise and different participants are needed (Creswell & Clark, 2011; Creswell, 2014) to have more views.

Qualitative research is superior for studying human experience and behaviour in depth, and the sample should be purposefully, not randomly, selected (Greene, 2007). Moreover, purposive sampling is more appropriate for developing theory in a qualitative study (Creswell & Clark, 2011; Creswell, 2007; Flick, 2011). It is identifying individuals who meet the study criteria (Lichtman, 2014) and who can provide the necessary information (Creswell & Clark, 2011). The strategy used to select participants for the qualitative phase was maximal variation sampling, in which individuals were selected who were expected to have different perspectives on the central phenomena (Creswell & Clark, 2011; Flick, 2009; Rapley, 2014). This was achieved by choosing individuals from different departments and different study years. By using this strategy, the views of participants should reflect their differences and provide a good qualitative study which yields a complex picture of the phenomena (Creswell & Clark, 2011).

Simple random sampling is characterised by every individual within the population having an equal chance of being selected (Cohen et al., 2011; Edmonds & Kennedy, 2013). The problem with this strategy of sampling, however, is that a complete list of the population is needed and this is not always available (Cohen et al., 2011). The 'fishbowl draw' technique can be used in random sampling (Kumar, 1999), but in this study the population is large (with the total of 10650 female undergraduate students) ("King Abulaziz University," 2016) and there is difficulty in obtaining data on the whole population (Cohen et al., 2011). However, a member of the university administrative staff helped me to send the link of the online questionnaire to the chosen sample (i.e. female undergraduate students).

3.8.2 Sample Rationale

The rationale for choosing female students of KAU and Saudi experts lies in their ability to provide the data and information with reference to the constructs of the study. In addition, KAU is one of the highest ranking universities in the Arab world; it has a large amount of funds available to aid learning and has recently launched its own apps. KAU is considered as founder of some KSA universities. Moreover, I am considered as insider at this university, and so data collection was easier here than at another university. Thus, the main sampling frame (KAU) and the unit of analysis (female students) meet the requirements of the study.

This study deals with only female students because of many reasons. First, males and females are separated in all levels of education in KSA. Second, there is a study that dealt only with male university students in the area of mobile technology acceptance in KSA (Seliaman and Al-Turki, 2012). Third, several researchers concluded that there is no difference between males' and females' attitudes towards technology (Rhema & Miliszewska, 2014; Suri & Sharma, 2013; Yau & Leung, 2016; Venkatesh et al., 2012). Forth, it has been asserted that when a female researcher interviews female participants, it provides a safer environment for all of them (Lichtman, 2014).

3.8.3 Sample Size

One problem that worries many researchers is the size of the study sample (Cohen et al., 2011). The sample size is the number of respondents chosen to take part in the study (Kumar, 1999). There is no straightforward answer to the problem of sample size as it depends on the purpose of the research, the level of accuracy, the number of variables and whether the research takes a qualitative, quantitative or mixed methods approach (Cohen et al., 2011). There is no rule for the number of people necessary for interview data as long as the aim of it is to interpret but not to generalise (Cohen et al., 2011; Lichtman, 2014) and better to work with fewer people (Arksey &

Knight, 1999); however, an interview sample is usually much smaller than a questionnaire survey sample as the latter looks for generalisation (Cohen et al., 2011; Creswell & Clark, 2011; Creswell, 2014). Thus, researchers need to find a larger number of participants if the study is quantitative rather than qualitative (Dawson, 2006). Moreover, in random sampling in the quantitative phase, the larger the sample the more it is representative (Cohen et al., 2011) and the more the better for factor analysis (Hair et al., 2010; Kline, 1994). Devellis suggested that the greater the sample size, the more powerful are the statistical tests (Devellis, 2003). Moreover, when the size is small (e.g. n=25), then there is a probability that a non-significant result may be due to insufficient power (Pallent, 2005). FA demands a large sample (Devellis, 2003), although researchers have argued over how large the sample should be (Devellis, 2003; Kline, 1994; Pallent, 2005). There have been various assertions made about the number of variables analysed relative to the sample size. For example, that the higher the number of items to be factored, the greater the sample size needs to be. A ratio of about 5 to 10 subjects per item up to about 300 subjects should be considered (Devellis, 2003). For example, for a 20 item factor analysis, 200 subjects would probably be adequate. The researchers suggested also that when the sample is as large as 300, the ratio is relaxed.

In this study, the sample size for the whole study was more than 700 subjects, "N=726", 20 subjects took part in the students' interview, 213 answered the initial questionnaire, 490 answered the main questionnaire, and three experts took part in the expert review interview. As structural equation modelling (SEM) will be used in this study to test the research model, the sample size is not an issue as long as the minimum sample size criterion of 200 participants is satisfied.

The optimum size of the sample in social research is based on the nature of the empirical study, the time and resources available, and various other considerations such as the length of the questionnaire, the size of the university and the nature of classes proposed (Wisdom & Creswell, 2013). Also, the use of surveys in social research does not necessarily have to involve samples of 1,000 or 2,000 people. Instead, research involving between 30 and 250 cases is often adequate (Dawson, 2006) as long as the study draws from a cross section of the population, is free from sampling bias and is in accordance with the principle of randomisation with each unit having an equal chance of being chosen.

3.9 Ethical Considerations

Research ethics demand that the participants and the information are treated with honesty and respect (Dawson, 2006). The ethical issues and implications for conducting research need to be carefully considered (Cohen et al., 2011; Kumar, 1999; Rabionet, 2009). An ethical approach also means to follow the code of conduct for acceptable professional practice (Cohen et al., 2011;

Kumar, 1999). Ethical considerations in research relate to both the participants and the researchers (Kumar, 1999) and include seeking consent, avoiding harm to participants, maintaining anonymity and confidentiality, avoiding bias, using acceptable research methodology, accurate reporting and the proper use of information by researchers (Cohen et al., 2011; Dawson, 2006; Kumar, 1999). The ethical considerations in qualitative research are more complex than in quantitative research as the former involves more human interactions (Mertens, 2014).

In accessing the opinions and perceptions of others via interviews, the ethical issues and implications need to be considered (Cohen et al., 2011; Rabionet, 2009). Researchers need to get permission to collect the data (Creswell & Clark, 2011). Permission to conduct the fieldwork of this study was obtained from the Ethics Committee of the University of Southampton and King Abdulaziz University (see Appendix B).

Regarding the interviews, printed forms for informed consent are provided for the interviewees, as well as a written guarantee of confidentiality and anonymity (Arksey & Knight, 1999; Cohen et al., 2011; Flick, 2011). I follow health and safety measures (Arksey & Knight, 1999) for the participants and myself by leaving details of interview times and locations and carrying a mobile phone while conducting the interviews. I am the person who has access to the recorded data, and I am the one who transcribed the interview data as all of the participants were female students who did not want anyone else to hear their voice.

Regarding the questionnaire, informed consent is set out in the first page of the online questionnaire for the participants, as well as a written guarantee of confidentiality and anonymity. The participants have the right to withdraw at any stage or to refuse to complete the questionnaire and this is made clear at the beginning of the questionnaire. I have sole access to the recorded data, all data was stored on my own devices and will be deleted once the research is completed.

3.10 Summary

This chapter discussed my positionality as a researcher, as well as the design, methods and analysis used in this study. The piloting, sampling, validity and reliability, and ethical considerations are also explained and discussed. Pragmatism was adopted as the research paradigm, and an exploratory sequential mixed methods design was used, with the methods of the semi-structured interview and online questionnaire. The study participants include HE students and experts in TAM, and the sample size for the whole study totalled over 700. Permission to conduct the fieldwork was given by the Ethics Committee of the University of Southampton. The next chapter presents the results

and discussion of the first phase of data collection (the interviews) to explore the factors of the proposed model.

Chapter 4: Phase one: Development of the Model

This chapter presents the analysis and results of the qualitative data collected through semi-structured interviews. It introduces the second version of the MALT model and defines each construct used in the MALT model.

4.1 Interview Analysis

Transcription is the "production of a written record of the interview" (Arksey & Knight, 1999:141) which is normally done before analysis, although some researchers prefer to analyse without transcribing (Arksey & Knight, 1999; Lichtman, 2014). In this study notes were taken during the interviews which were recorded. I have done the transcriptions by myself in order to maintain accuracy and enable ease of analysis (Arksey & Knight, 1999; Lichtman, 2014). As the interview audio files were in Arabic, the student responses were transcribed from the recording in Arabic and the analysis was also done in Arabic, as this was the most appropriate way to ensure a more rigorous account of the respondents' meanings. Moreover, as there is no well-known qualitative data analysis software program which supports the Arabic language, I analysed the data manually.

The interview data was analysed thematically. Thematic analysis is a method of inspecting qualitative data and then identifying, and reporting patterns (Braun & Clarke, 2006; Willig, 2014). It minimally organises and describes the data set in rich detail and can go further to interpret different aspects of the research topic (Braun & Clarke, 2006). It "refers to the process of identifying themes in the data which capture meaning that is relevant to the research question, and perhaps also to making links between such themes" (Willig, 2014:147). Dawson states more simply that thematic analysis refers to the analysis of data by themes (2006). However, Braun and Clarke argue that thematic analysis is a poorly demarcated, rarely-acknowledged, and yet widely-used method of analysing qualitative data (2006). According to Braun and Clarke (2006) there are six steps to analyse the data thematically. First, the researcher needs to be familiar with the data. Second, generating initial codes by coding across the data. Third, searching for themes. Fourth, reviewing the themes by designing a map. Fifth, defining and naming the themes. Finally, producing the report. These six steps are considered for the inductive analysis. Some of the themes are already generated either from the literature or the theory, as in the deductive analysis. Accordingly the researcher needs to find the codes related to these themes and produce the report (see Appendix C.5).

The choice between inductive and deductive analysis depends on how and why the data is coded (Braun & Clarke, 2006). Here, I coded the data in order to explore the factors influencing students'

motivation and acceptance of tablet use for learning based on a model derived from the literature and from students' responses. Thus, both deductive and inductive strategies were applied (Figure 11). In deductive thematic analysis, the analysis would tend to be driven by the researcher's theoretical or analytic interest in the area (Braun & Clarke, 2006). Braun and Clarke argue that this kind of analysis provides less of a rich description of the data overall, but a more detailed analysis of some aspects of the data. The proposed model of this study is based on the literature and there are some clear themes which has been identified from the interview data. In inductive analysis, data from interviews is divided into codes; and then to categories and then themes. Coding the data means classifying events into separate categories and labelling these (Kowal & O'Connell, 2014). Braun and Clarke's six steps in the inductive thematic analysis have been used (2006).

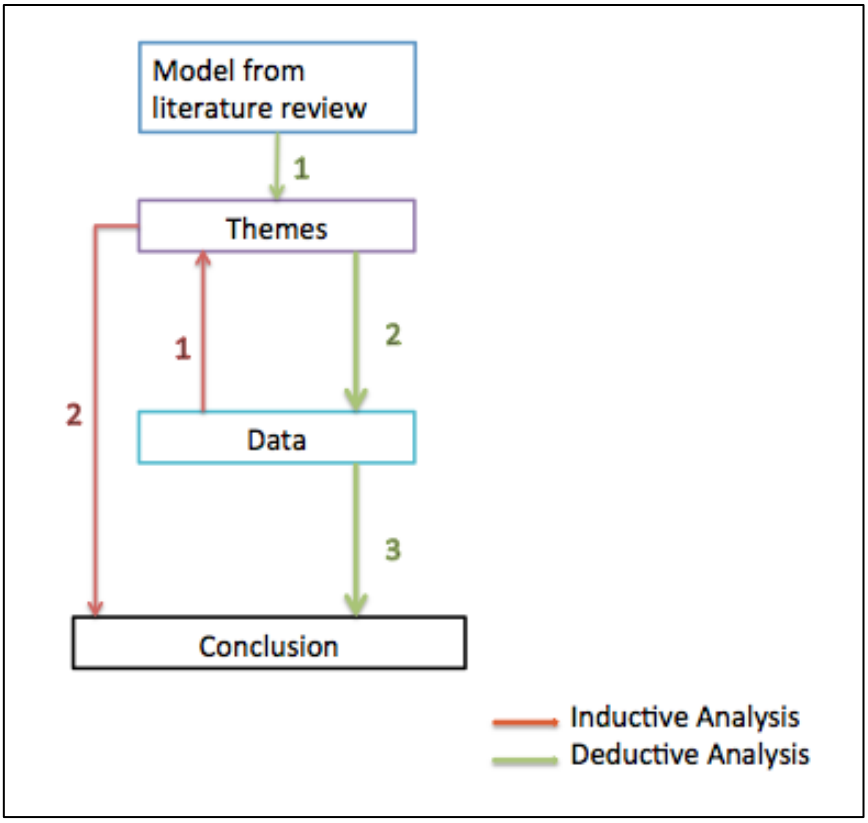

Figure 11 Inductive and deductive analysis

4.2 Interview Challenges

I faced challenges during this qualitative phase of data collection. According to Arksey and Knight (1999) there are two main issues involved in approaching people for interviews. One is gaining access to the chosen research site and the other is obtaining the cooperation of people the researcher would like to talk to. I have faced and successfully dealt with both of these issues. Firstly, it was difficult to obtain permission to conduct the interviews with students at the selected

university. However, with the help of supporting documentation from the supervisor and the university ethics committee, as well as a participant safety/confidentiality letter, permission was finally obtained. Secondly, at each university visit, I was asked by gate security to show degree certificates and to sign a form. Thirdly, data collection was hindered by the ongoing exam period at the university, which meant that many of the students were reluctant to volunteer as participants due to time issues. However, this was resolved by giving clear information about the time, place and duration of the interviews. Finally, some of the students refused to give permission for voice recording of the interview and so I had to find other participants who agreed to this condition. Despite these difficulties I was able to conduct a satisfactory number of interviews and collect the required data.

4.3 Interview Results

This section is an analytical narrative that illustrates the story of the research data. The process of data analysis attempts to answer the research questions and to meet the investigation aim of bringing a better understanding of the female undergraduate students' attitude and use of tablet as a mobile learning tool. Twenty interviews were conducted (N=20) and their analysis eventually revealed four main themes, as the mind map shows in Figure 12. The themes are students' perception of tablet use; students' attitude towards tablet use; the requirements for tablet use; and tablet usage itself.

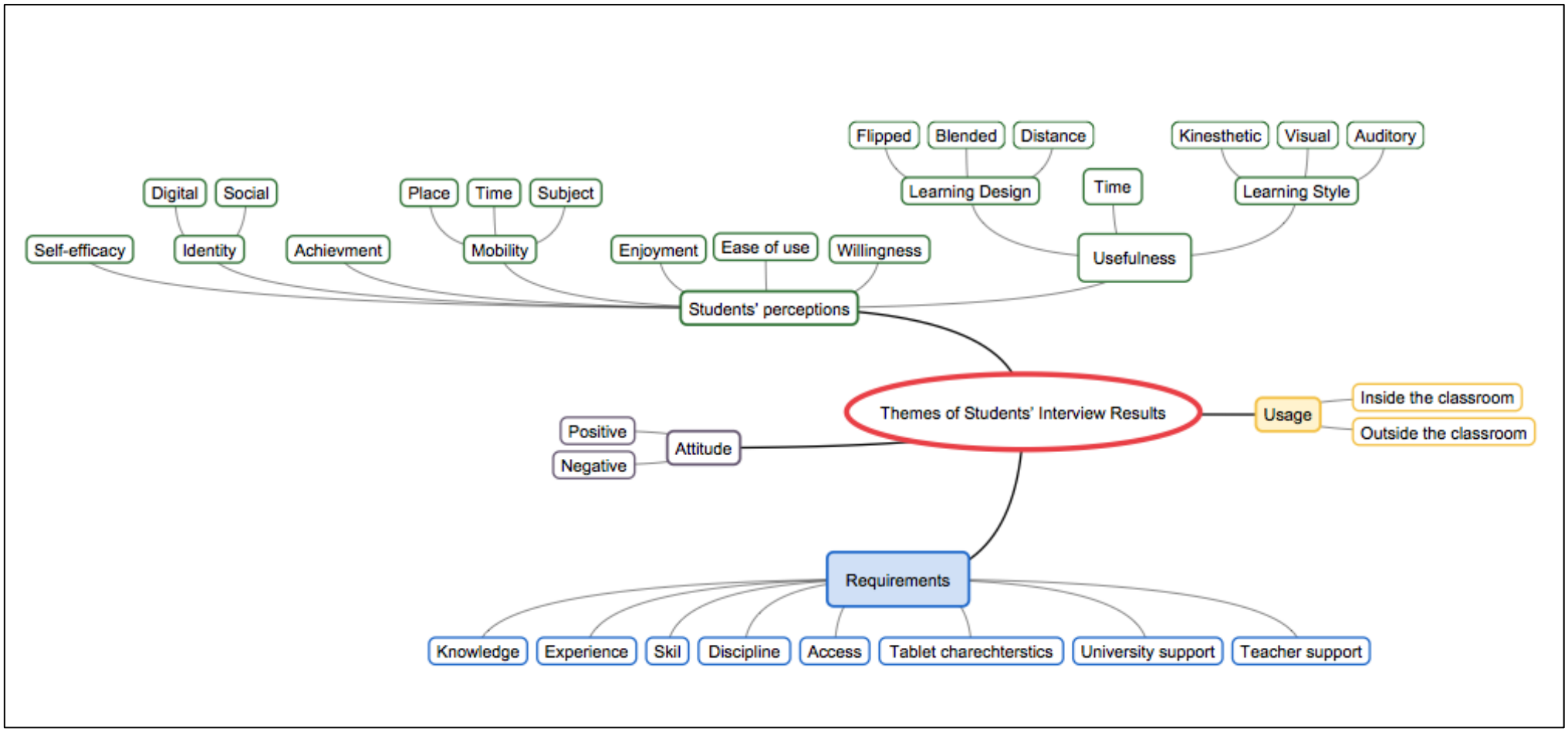

Figure 12 Themes of students' interviews

In presenting the findings below, alphabetical and numeral codes are used instead of interviewees' names to preserve anonymity. The ethics protocol requires that all data is anonymised and kept securely. Each participant in the study was given a code. The first letter (S) refers to the student. The second letter (I) represents the method used in collecting the data. The third number represents the participant's individually assigned number (1 to 20). Thus Interviewee SI20 refers to student number 20, who was interviewed.

Note: the descriptions, 'a few', 'some', 'many' and 'most' are used in a regular manner to indicate the number of respondents. A specific range of values is established for each qualitative adjective. A few indicates less than 3 participants; some, 4 to 8 participants; many, 9 to 15 participants; most, 16 or more participants; and all means 20 (i.e. the total number of participants). The descriptions and evidence from the research findings on the four themes are given below.

4.3.1 First Theme: Students Perceptions

The first theme to emerge from the interviews is the students' perceptions of tablet use for learning. Students talked about how they felt about tablet use in learning. The interview responses were labelled under eight sub-themes, either deductive, which have already been built from the theory, or inductive, based on the codes and categories. The sub-themes are willingness, self-efficacy, enjoyment, identity, achievement, mobility, usefulness and ease of use.

- Willingness

Willingness refers to the eagerness and interests in using tablet for learning. The interview data showed that many of the higher education students perceived that willingness to use a tablet in learning was an important stage in accepting tablet use in learning. For example, "If students are eager and interested in tablets, they will use them in learning" (Interviewee SI6); "Students nowadays tend to love using a tablet" (Interviewee SI5). Some students showed readiness to use tablets in learning; for example, "I'm curious about using a tablet for learning" (Interviewee SI8).

"If students aren't interested in using a tablet for learning, they won't use one" (Interviewee SI3). A few participants were unwilling to use a tablet in learning; for example, Interviewee SI18 stated, "I don't feel inclined to use a tablet in learning" and Interviewee SI20 said, "I'm not interested in using technologies in learning". The reasons why these students gave these responses were based on their limited knowledge, experience and skills of using tablet for learning.

- Self-efficacy

Self-efficacy refers to the confidence in one's ability to use a tablet for learning. The data collected in the interviews showed that many of the students perceived that self-efficacy was important to tablet use in learning. Students identified the importance of self-efficacy and its impact on tablet use in learning, for example, "Having self-efficacy plays an important role in students' decisions to use a tablet for learning" (Interviewee SI2). "Students must be able to use tablets for learning" (Interviewee SI3) and, "The more confident we are in using tablets, the more we use them in learning" (Interviewee SI2).

Most of the students stated that they are able to use a tablet for learning. For example, "I have the ability to use a tablet" (Interviewee SI16) and "I am capable of using a tablet for learning" "I do not think I need help from others while using tablet for learning" (Interviewee SI4). However, one mentioned that students should learn how to use a tablet properly if they do not already know, "I think that students who don't know how to use a tablet should have some form of training" (Interviewee SI11). All of the students interviewed said that they were confident about using a tablet and some expressed confidence in using a tablet in the classroom; for example, Interviewee SI4 stated, "I have the confidence to use a tablet and so I use one in class".

- Enjoyment

Enjoyment refers to the fun when using a tablet for learning. The interviews revealed that students perceived tablets to be enjoyable devices and enjoyable to use in learning, for instance, "Using a tablet in learning makes it more interesting" (Interviewee SI12); "We will have more fun if we use tablets in our learning" (Interviewee SI4). Most interviewees agreed that they enjoyed using tablets in learning; for example, Interviewee SI17 stated, "I enjoy learning more when I'm using a tablet".

One student elaborated by saying, "I enjoy using a tablet because I can view photos and drawings related to my discipline" (Interviewee SI8). Many students liked the fact that tablets differ from traditional learning materials; for example, "I enjoy using a tablet because it is different from traditional books" (Interviewee SI3). One interviewee (SI19) linked enjoyment to ease of use, saying, "I enjoy using a tablet because it is easy to use", and Interviewee SI11 linked enjoyment to mobility: "I enjoy using a tablet because I can carry my device with me wherever I go".

- Identity

Identity refers to how students see themselves when using a tablet for learning. One of the factors governing attitude to tablet use in learning was found to be identity. The data collected in the

interviews was classified into two themes of social and digital identity. This theme was identified after collecting and categorising the codes.

With regard to social identity, many students felt that using a tablet in learning was a way of acquiring a better social reputation; for example, Interviewee SI3 stated, “Students love to use tablets because they increase prestige” and added, “If I don’t use a tablet, I will be considered old fashioned”. Some students talked about how using a tablet can influence their personality; for example, “I can contact others without the need to introduce myself…it gives me more encouragement, so I can ask anyone” (Interviewee SI14) and, “I use a tablet to be like my friends” (Interviewee SI7).

As for digital identity, most students felt that they belonged to the digital generation and that tablet use was consistent with this. For example, “Mobile technology devices are important in learning nowadays” (Interviewee SI12); “The most common device belonging to our generation is the tablet” (Interviewee SI2); and, “Students nowadays tend to love using tablets” (Interviewee SI5). This last interviewee also stated that, “Today, mobile technology is in every home and everyone has at least one device of their own”. Some asserted that most students nowadays regard mobile technology in learning as the norm. “Most students accept the use of mobile devices in learning” (Interviewee SI10). On the other hand, some students preferred not to use a tablet for learning, stating, for example, that they “prefer to use handwriting” (Interviewee SI18), and would rather “study using paper copies of books” (Interviewee SI20).

Many students highlighted the difference between students’ and teachers’ generations in accepting the use of tablets in education; for example, “Younger teachers like using technology inside the classroom more than older ones” (Interviewee SI9). “Older teachers do not belong to our generation of mobile technology users” (Interviewee SI11) and, “The teachers’ generation is different to the students’ generation and so students won’t take long to learn how to use tablets in their education” (Interviewee SI3).

- Achievement

Achievement refers to students’ better academic grades when using a tablet for learning. According to the interview responses, another factor involved in how tablets were perceived in learning was achievement. Many students pointed out that tablets could help them to achieve more. However, whether tablets helped students to achieve more depends on how they used them, for example, Interviewee SI18 stated, “It depends on how I use the tablet; if I use it in a good way, of course it helps me to achieve more”. One of the reasons why students believed that tablets helped them to achieve more academically was their mobility, as illustrated by Interviewee SI19, who said, “A tablet

improves my achievement because my curriculum is with me wherever, whenever", and another felt it did so "because it organises my time and because of its applications" (Interviewee SI4), and yet another asserted, "It makes my learning easier" (Interviewee SI18). Some students compared the use of tablets with that of smartphones in learning achievement; for example, "Tablets are more suitable for learning than smartphones as smartphones distract me a lot" (Interviewee SI3). On the other hand, few students mentioned that tablets may distract them too; for example, "For me personally there is nothing on the tablet that can distract me, but others may use a tablet to distract themselves inside the classroom" (Interviewee SI6).

Many of the participating interviewees stated that their grades were higher because they use a tablet; for example, "My tablet strengthens my academic achievement" (Interviewee SI13). "Using a tablets affects my achievements positively" (Interviewee SI9), and "I think my grades will be higher" (Interviewee SI10). A few interviewees said that whether they used a tablet or not would have no effect on their achievements; for example, "I do not think tablets affect my achievement" (Interviewee SI12). One participant felt it posed a health problem as "using a tablet gives me a headache so I wouldn't achieve more by using one" (Interviewee SI5).

- Usefulness

Usefulness refers to tablet's value when using it for learning. Students perceived the tablet as a useful learning tool. For example, "I use a tablet for learning because it is so useful" (Interviewee SI16), and, "My tablet is more suitable for learning than other technology devices because it does not distract me" (Interviewee SI8). Although Interviewee SI20 had a negative attitude towards tablet use in learning, she stated that "Tablets are useful for students who accept it in their learning".

Most students explained their reasons for saying that tablets are useful; for example, "A tablet helps me a lot in learning because I can carry all my learning material on one device" (Interviewee SI4), "Tablets mean that teachers don't have to print and distribute a lot of paper" (Interviewee SI11), "I can have access to more resources for my learning by using a tablet" (Interviewee SI13). Interviewee SI19 stated that "Anything students can write by using a tablet pen or a virtual keyboard can be saved directly to the document and so a lot can be stored on one device and there is less risk of paper getting lost", and Interviewee SI7 said that, "Some students use tablets to improve themselves".

Most students felt that tablets are more convenient; for example, Interviewee SI17 stated that "one of the advantages of tablet use in learning is that they are easier to carry, more comfortable than carrying heavy bags and better than buying expensive books".

Most students stated that tablets save time and allow them to be more organised; for example, “It saves our time” (Interviewee SI16). “Students can do their assignments immediately and in a more organised way by using a tablet” (Interviewee SI11). “If I do not have time to print learning materials, I take my iPad with me to the classroom” (Interviewee SI6).

Many students said that tablets are useful for online learning, for example, “We can study the lectures online by using a tablet” (Interviewee SI5). Some students said that tablets are useful for blended learning; for example, “I prefer to study by blended learning with the tablet use because it is more useful” (Interviewee SI17). Others said that tablets can be useful for students living far away; for example, “distance learning students can study from Blackboard by using their tablets” (Interviewee SI7). Yet others said that tablets can be used for flipped classrooms; for example, Interviewee SI19 said, “Tablets are useful for studying the learning slides before coming to the classroom”. Many students said that tablets are useful for any learning style; for example, Interviewee SI18 felt that, “using a tablet for learning makes students use all their senses in learning”. A number of other participants felt that tablets have a limited role, for example, Interviewee SI5 stated that, “Tablets are useful but will never replace traditional classrooms” and “tablets are useful for blended learning” (Interviewee SI1). A few students felt that tablets would distract them from learning, for example, “mobile devices distract me from learning” (Interviewee SI20), “I cannot study with a tablet as I end up wasting my time” (Interviewee SI3). Many students pointed out that tablets are environmentally-friendly in the sense that they cut down paper consumption. “Tablets reduce the quantity of paper you need” said Interviewee SI2. Interviewee SI4 added, “I don’t need print-outs because the learning slides and the books are now available online” and Interviewee SI19 agreed that, “Students don’t need so many paper resources, as they can download learning materials and slides on their tablets”.

- Ease of use

Ease of use refers to the ease of tablet use for learning and the quality of ‘user-friendliness’. Students generally perceived that tablets are easy to use in the context of learning; for example, “Tablets are so easy to use” (Interviewee SI1), and “Tablets are easy and anyone can learn how to use them in learning easily” (Interviewee SI11). Some students affirmed that they felt comfortable with using tablets; for example, “I feel more comfortable with using a tablet because it is easy to use” (Interviewee SI16), and, “It makes everything easier” (Interviewee SI19 and Interviewee SI6).

Moreover, many students stated that tablets make it easier and faster to obtain information; for example, “We can search for information easily by using tablet” (Interviewee SI8) and, “I can get information faster using a tablet than by going to the library” (Interviewee SI13). Most of the

interviewees mentioned that tablets are “easy to carry” (Interviewee SI12). Some students compared tablets with other devices and were of the opinion that, “tablets are the easiest device to use” (Interviewee SI2) and “easier to use than smartphones” (Interviewee SI3). Few students were undecided about how easy it is to use a tablet, for example, Interviewee SI18 stated that “tablets are not so easy and not so difficult — they are somewhere in between”. A few interviewees linked their enjoyment of tablets to ease of use; for example, “I will enjoy using a tablet in learning because it is easy to use” (Interviewee SI19).

- Mobility

Most students realised that tablets can provide them with greater mobility, meaning that these devices enable them to study any subject, anywhere and anytime. Many students showed a positive attitude towards tablet use in learning because of its mobility. For example, Interviewee SI5 pointed out, “I can surf the internet wherever I am by using tablet”, and Interviewee SI2 said, “My curriculum is with me all the time, wherever I am”. One of the interviewees explained that “The device that I most use is my iPad because I can carry it with me all the time” (Interviewee SI7). “The tablet can’t delay my learning because I’ve always got it with me” (Interviewee SI12), and another interviewee said “I always have my tablet with me because it is an easily movable device” (Interviewee SI9).

One of the advantages of using tablets identified by the students in this study is that students can learn wherever they are, for example, “when I am at the hospital” (Interviewee SI18). The same interviewee also described mobile learning as being “without a limit as to place”. Students are able to use tablets to study wherever they are, In addition, Interviewee SI15 believed that tablets can solve location problems experienced by some students; for example, “those who cannot come to the university either because they are far away or they have a disability”. Another aspect of mobility provided by the tablet, according to the students’ perceptions, was the freedom to learn whenever they wish: “I can use it in my free time” (Interviewee SI20), “It is available all the time” (Interviewee SI14), and “It is with me all the time” (Interviewee SI16).

Many cited the portability of tablets as an advantage, “because we can carry them easily whenever and wherever” (Interviewee SI2) and “you can carry the tablet wherever you go” (Interviewee SI4). One interviewee linked her enjoyment of learning with a tablet to its portability, as she said, “Using a tablet for learning will be more enjoyable because I will have my curriculum with me wherever I am” (Interviewee SI11). The other linked the portability of the tablet and her achievement, saying, “The tablet lets me achieve more because I can carry it wherever I go” (Interviewee SI19).

A third area mentioned by students is that tablets allow students to study any subjects they want; for example, the tablet can be used "to connect to YouTube tutorials" (Interviewee SI18) and "search engines such as Google" (Interviewee SI17). In this way answers can be found to questions such as "how to do a scientific report" (Interviewee SI19), as well as "any new information" in their chosen field (Interviewee SI7).

4.3.2 Second Theme: Attitude

The second theme of the interview was the students' attitudes towards the use of tablets in learning. The information collected through the interviews was classified under two themes of positive and negative. Attitude is considered as one of the deductive themes in this study and it was mentioned by all of the students. As one of them said, "The use of tablets depends on the attitude of the students, whether or not they like it and how they feel about it" (Interviewee SI3).

- Positive

Many participants showed a positive attitude to using tablets in daily life. They expressed that they love this device and always use it for personal purposes. For instance, one of the interviewee said, "I love the tablet so much" (Interviewee SI1). Students also liked using useful or entertaining applications on their tablets; for example, one mentioned, "I always try to use any new applications on my tablet" (Interviewee SI13). In the interviews many students expressed their love of tablets, saying that they really wanted to apply them in their learning. They shared a number of reasons for this positive attitude. Firstly, many students already used a tablet. As one student said, "It is already in the hands of many students, so it is better to use it for learning" (Interviewee SI3). Additionally, many considered the use of tablets in learning as "a good idea" (Interviewee SI17), and considered studying from printed text "old fashioned" (Interviewee SI18).

It was generally found in the interviews that although most students did not use a tablet for their learning, they still believed that it has potential for learning activities and felt that learning could be made more convenient by using it. Some expressed that they felt positive about tablet use in learning because "It benefits me" (Interviewee SI16), "makes everything easier" (Interviewee SI6), "saves time" (Interviewees SI4 and SI5), and allowed them to be "more organised" (Interviewee SI19). Others felt that by using a tablet in their learning, "my university will have better reputation" (Interviewee SI1) and described their education as "modern" (Interviewee SI19). There were some students who supported the idea of using tablets inside the classroom but "with rules" (Interviewee SI16) as they said that if there were none, students would become distracted by other activities available on the tablet. Furthermore, they wanted to use tablets in learning while "using books at the same time" (Interviewee SI5).

- Negative

On the other hand, some participants showed negative attitudes to using tablets in learning, either because they did not like technology in general or preferred studying using printed texts; for example, " I'm not convinced about using it inside the classroom" (Interviewee SI20), "I don't like technology" (Interviewee SI18), "I don't support the use of any smart device inside the classroom" (Interviewee SI20) and the same interviewee said, "I like studying from printed texts". Other similar comments were, "I don't like tablet computers" (Interviewee SI15), and "I don't like writing using a tablet" (Interviewee SI1). Interviewee SI6 also made the point that "It's not good to depend a lot on technology".

Interviewee SI2 elaborated on her point of view by saying, "I understand more when I learn face to face and if I have any questions, I prefer to ask my teacher". Interviewee SI12 mentioned that although she does not like the tablet computer, a lot of her friends like them. However, Interviewee SI16 expressed "Some students were surprised to see me studying using a tablet" and Interviewee SI5 thought that "It's difficult for students who used to study from books to study from tablet computers".

4.3.3 Third Theme: Requirements

The interview findings showed that the supporting requirements for tablet use in higher education were experience, skill, discipline, knowledge, access, tablet characteristics, university support and teacher support.

- Knowledge

One of the requirements for tablet use in higher education, according to students' responses, was knowledge of how to use a tablet in learning. The data collected in the interviews showed that students lacked knowledge in this area. "Knowing how the tablet works is very important and I think students may decide not to use it because they lack knowledge" (Interviewee SI19). Some students acknowledged that they possessed very limited knowledge about tablet devices. For example, some believed that, "A tablet is an iPad" (Interviewees SI4 and SI7). In her response to the question about whether she knew about tablets, Interviewee SI8 replied "I know iPad". Others thought of it as a Galaxy Tab; for example, Interviewee SI17 said, "I've heard about tablets but have never used one". She actually owns an iPad, but thinks of a tablet as "that device which belongs to Samsung" which refers to the Galaxy Tab.

The interviews revealed that some students, such as Interviewee SI7, were unaware of how to use

a tablet properly for learning. In her words, “I don’t have any background on how to use a tablet for learning”. Some of them, however, claimed that they had very limited knowledge relating to the use of tablet in learning, “I have basic knowledge of tablet computers” (Interviewee SI1) and “I only know how to access the tablet” (Interviewee SI3). A few thought that tablet use in learning is limited to downloading and viewing learning slides: “I think learning with a tablet is just about viewing learning slides and searching on the internet” (Interviewee SI6). In interviews, many students believed they needed training in order to know more about tablets and how they can be used in learning. “The university should provide training for us on how to use tablets” (Interviewee SI11). Some interviewees, such as Interviewee SI19, were convinced that all students should increase their knowledge of tablets and use them in learning. Interviewee SI1 believed that gaining knowledge of tablets is vital.

- Experience

According to the interview data, another requirement for using tablets in learning is experience. “I have a lot of experience with tablets and this enables me to use one for learning” (Interviewee SI15). However, Interviewee SI20 stated, “I do not think you need experience…I think as soon as I have a tablet I will learn how to use it quickly”. Many of the students said that they had experience of tablet use. Interviewee SI2 said, “I’m able to use a tablet”, and Interviewee SI9 stated, “My experience is good, I search for and use a lot of applications on my tablet”. Interviewee SI13 said, “I have a lot of experience because I love using my tablet”. Some admitted to less experience; for example, Interviewee SI4 said, “my own experience is fine but there are many who have more experience” and Interviewee SI16 commented, “I have little experience in using a tablet…I don’t use it in learning” and Interviewee SI18 admitted, “I don’t have much experience as I only use it to search for websites”. There were a number who could use a tablet but did not use one very often; for example, Interviewee SI10 said, “I’m able to use a tablet but I use it rarely”. In the interviews, some participants indicated how much they used a tablet. Interviewee SI2 said, “I use my tablet a lot”, Interviewee SI4 said, “I use it daily”, Interviewee SI19 asserted, “I use my tablet for around three hours daily” and Interviewee SI7 said, “I use my tablet daily for two hours”.

- Skill

Skill refers to the learned ability to use tablet for learning. Another requirement for tablet use for learning was students’ skills in using them. The interview responses showed the participants’ lack of skill or need for training in using tablets. According to some students, their skill was one of the reasons for using a tablet. For example, “I draw on the tablet using a pen” (Interviewee SI1), “I love taking photos with the tablet” (Interviewee SI2), “I have plenty of skills and anything I don’t know

how to do, I find out how on the Internet" (Interviewee SI4), and "I can download any new applications" (Interviewee SI5). Some mentioned that they had no difficulty in using the tablet; for example, Interviewee SI11 reckoned, "I am able to use a tablet, and don't have any difficulty at all". Many of the participating students, for example, Interviewee SI3, felt the need to gain more skills in using tablets more effectively in their learning because they had limited skills, as typified by the following: 'I think our skills are limited in using tablets for learning and so I think we need training" (Interviewee SI3). Interviewees SI10, SI16, SI17 and SI18 explained their skills were limited to reading and writing quickly, and searching the Internet.

- Discipline

Another factor in tablet use for learning was academic discipline. It refers here to the department in which students are registered. In the context of this study, there are only two academic disciplines; one is natural science and the other is social science. Some said that natural science subjects required tablets, but not social sciences; for example, Interviewee SI4 reported that, "Health students can use tablets to download applications with information about the human body", and Interviewee SI18 felt that, "Social sciences subjects do not need tablets", as she explained that, "The information is already in the traditional books and social science gains no advantages by using tablets". These students believed that disciplines in the natural and applied sciences, as well as health, needed to use tablets more. Many students expressed that using tablets in their learning depended on their discipline at the university. For example, Interviewee SI2 said "it depends on which discipline the student is in…there are faculties which use only printed books and there are some in which it doesn't matter if students use printed books or tablets". Interviewee SI3 stated "there are some faculties which need a tablet….it can't suit all disciplines". In the interviews it emerged that some students were encouraged to bring their devices to class: "In some faculties, teachers ask us to bring our technology device with us to the classroom, and most bring their tablets with them" (Interviewee SI16).

- Access

Another requirement for tablet use was internet access. Many of the participating students, for example Interviewee SI2, felt the need for Internet access, "If there is no access to the Internet, we can't use tablets", Interviewee SI7 said that "Students won't use tablets if the Internet isn't connected" and Interviewee SI12 stated that "Access to the Internet is important because we need it". Although all participants stated they had Internet access at the university, they explained it was limited either by not being in all areas of the campus or not available for all applications and websites. For example, Interviewee SI19 explained that "the Internet speed isn't high, and doesn't access all applications, so we couldn't access Whatsapp for a while, even though we create study

groups and share learning information with each other by using Whatsapp". Interviewee SI3 highlighted that, "There are some websites which are not accessible inside the university".

In the interviews, it was clear that certain participants had decided to not use a tablet at the university because of the bad internet access. "Sometimes the access to the Internet is bad within the university, so I wouldn't use a tablet even if the university decides to allow it" (Interviewee SI18). Some students used their 3G to access what they wanted, for example Interviewee SI11 said, "I sometimes use my 3G to access what I want inside or outside the university", and Interviewee SI12 said, "I use my 3G in the places where I can't access the internet within the university".

- Tablet characteristics

One of the factors affecting tablet use for learning is its characteristics. Some of the participating students, for example, Interviewee SI20, were put off by the limitations of the tablet as a device. "I don't think I would use a tablet because it's difficult to deal with," she explained, "I can't open many resources in the same screen, and it sometimes gets stuck. It also has side effects, like on our eyesight". Other interviewees complained that tablets "sometimes get stuck" (Interviewees SI1 and SI4), "can lose power and turn off" (Interviewees SI2 and SI4), "take up room in our bags…they are quite large" (Interviewee SI3), "need a lot of power and cause headaches" (Interviewee SI5), and "can suddenly get stuck during the lesson" (Interviewee SI11), "Tablets don't have USB ports" (Interviewee SI12). Thus, some interviewees felt the limitations in tablet features meant that "It's better to learn by traditional methods as well as the tablet, in order to overcome the tablet's limitations" (Interviewee SI17). Some felt that tablets have good features; for example, Interviewee SI8 said that, "Tablets are good because some take SIM cards" and Interviewee SI3 stated, "I don't have any difficulty in charging my tablet and it has more power than a smartphone".

- University support

Another factor mentioned in the interviews concerned university support, meaning the extent to which the university supported using tablets for learning. Many students acknowledged that the role of the university was important; for example, Interviewee SI1 stated, "My faculty plays a major role in allowing students to use tablets" and Interviewee SI3 said that, "If the university improves its learning management systems and applications, students will be able to use tablets in their learning". Moreover, students revealed that they would be unable to use tablets if the university did not "use learning management systems" (Interviewee SI17), "provide all the devices" (Interviewee ST1), "provide maintenance foundation" (Interviewee SI18) or "use its own apps" (Interviewee SI19).

Many students wanted the university to support tablet use; for example, Interviewee SI1 said, “The university needs to have technicians available when we need them” and Interviewee SI12 predicted that, “When the university decides to provide the students with tablets to use for learning they will follow specific rules and change the pedagogy”. In addition, a few students felt that the university should train its teachers; for example, Interviewee SI3 said that, “Our problem is always that we develop the curriculum and forget about developing the teachers”. Also, one of the interviewees believed that the university should provide them with tablets as “some students can’t afford the cost of a tablet” (Interviewee SI1). Many of the participating students acknowledged what the university had done to help them to use mobile technology devices; for example, “The university develops the *My KAU* application where we can access our grades” (Interviewee SI2), and “It provides an online library where we can download books” (Interviewee SI4). The same interviewee mentioned that “the university communicates with us using social media websites”. Interviewee SI5 pointed out that “Our lectures are available online and we can download them”. The students also complained that the university websites often got stuck. “Although the university has its own learning management system website where we can check and amend our timetable, it’s often stuck and we’re unable to do anything” (Interviewee SI3).

- Teacher support

The interview responses also showed that tablet use in learning is affected by the teacher support. Success in tablet learning was thought to depend very much on teachers’ support to students. For example, it mattered “whether teachers use technology devices in the classrooms” (Interviewee SI19) and it was felt that, “teachers must support and help students to use tablets” (Interviewee SI1).

In the interviews students indicated that if teachers did not “upload the PowerPoint slides online” (Interviewee SI11), “ask students to submit assignments online” (Interviewee SI16) “ask us to send any queries by email” (Interviewee S15), “send information about the lecture by using the university app” (Interviewee SI2), “encourage students to use their devices when doing assignments” (Interviewee SI7), or “submit feedback online” (Interviewee SI4), then students were not able to use tablets in their learning. “Teachers who upload their timetable, lectures and feedback on the learning management systems, I would choose to attend classes with them” (Interviewee SI4). Teachers should encourage students to do as much as possible using the tablet, “even simple tasks” (Interviewee SI18). “If teachers know how to use the tablet, it will be fun for students to use it” (Interviewee SI3).

In interviews, a few students identified that they had negative attitude to using tablets in the classroom because of poor monitoring by teachers. For example, Interviewee SI8 stated, “I don’t like the idea of using tablets inside the university because teachers may not pay attention to whether students are accessing the correct applications”. A few students were concerned about teachers’ training on how to use tablets, for example, Interviewee SI3 stated, “The University must develop teachers by training them in how to use tablets”.

4.3.4 Fourth Theme: Usage

Usage includes the intention to use tablet computers and actual usage inside and outside the classrooms. From the interviews, it was revealed that most students intended to use a tablet for learning if the university decided to provide them with one in the way the university ask them. Interviewee SI3 explained that, “If the university provides me with the tablet, of course I will use it in the way they ask me”, and Interviewee SI12 said that, “Whatever the university asks me to do with the tablet, I will do it”. Interviewee SI14 affirmed that she “would use a tablet as much as possible in learning”. Although she has her own tablet, she said that, “I would use a tablet in whatever way the university asked, if it were to provide me with one” (Interviewee SI17).

In the interviews, most of the students indicated that they would use a tablet to input data, use ready-made applications or/and communicate with friends and teachers. The tablet would be used to “do my assignments” (Interviewee SI2), “communicate with my friends and teachers by emails” (Interviewee SI3), “download translation applications and writing notes and record lectures if I have permission” (Interviewee SI5), “access Blackboard” (Interviewee SI11), “download and use any useful application that helps me in learning” (Interviewee SI16), and “record the experiments and calculate how much time the experiment took” (Interviewee SI19). However, Interviewee SI9 mentioned that “I would not only use my tablet for learning, but for other things as well”.

On the other hand, a few students insisted that they did not want to use a tablet for learning. One of the interviewees had a negative attitude towards using a tablet in learning, saying “If the university provided me with the tablet, I would use it to only entertain myself” (Interviewee SI20). Although Interviewee SI18 considered studying using printed books as old fashioned and felt that a tablet could help her to achieve more, she predicted, “I wouldn’t use a tablet for learning if the university provided me with one, to be honest”.

Many students affirmed that they already used a tablet for learning. A few used their tablets inside the classrooms. Interviewee SI2 stated, “I use my iPad in my learning and take it with me wherever I go inside the university, so my curriculum is with me wherever I am”. Those that used tablets did so in a limited fashion. Interviewee SI4 explained, “I already use my tablet at university, I use it to

help with translation and for viewing saved documents". Interviewee SI19 said, "I take a photo of the blackboard and view it when I return home". Many use tablets outside of the classroom. One of the interviewees, who studied interior design, explained how she used her tablet in learning, "I always rely on Instagram to find design images and download them. I also use applications to help me with my designs, like Sketch app" (Interviewee SI1). "I study learning slides from it", said Interviewee SI6, and SI15 said, "I watch video tutorials on YouTube on my tablet". Students commented that it reflected well on the university if it provided students with tablets for learning. Interviewee SI6 felt, "It is good for our university's reputation among the other universities that we use tablets for learning, as it indicates improvement and ability to cope with new technologies", and Interviewee SI19 felt that "using a tablet in learning is modern learning, and the university will have a better reputation if its students use tablets in their learning".

4.4 MALT Model: Second Version

4.4.1 Introduction

After conducting interviews with students (n=20), a second, refined version of the motivation and acceptance of learning with tablets (MALT) model was produced based on the analysis of the interviews responses (Figure 13). After considering the factors that might influence students' motivation and acceptance of tablet use for learning based on literature (Figure 9), four additional constructs were added to the original model based on students' interview responses. These were identity, willingness, achievement and mobility. In addition, actual usage was considered in the second version of the model, as it appeared from the interviews that some students have already been using tablets for their learning. There is no implementation of tablets in the context of the study. Consequently, this study attempts to investigate the influence of the above constructs on attitude and behavioural intention to use tablets for learning. As students fall within the same age range and all of them are female, the age and gender have not been considered.

In MALT model (version 2), actual performance is the dependent variable. There are two other variables, which are attitude towards tablet use and behavioural intention to use a tablet. The model also features eight factors relating to perception; the first five are usefulness, ease of use, achievement, mobility and identity (considered as extrinsic motivation), the last three are enjoyment, self-efficacy and willingness (considered as intrinsic motivation). As well, there are eight moderating variables: experience, skill, access, knowledge, discipline, university support, teacher support and tablet characteristics.

Motivation is the mechanism which drives human behaviour and action (Chien & Lin, 2012). Motivation theorists typically classify motivation as extrinsic or intrinsic, to distinguish between the two types of behavioural reward (Yoo et al., 2012). Intrinsic motivation arises out of the internal sense of satisfaction or achievement produced by a particular behaviour, while extrinsic motivation is generated by external rewards such as money or social recognition.

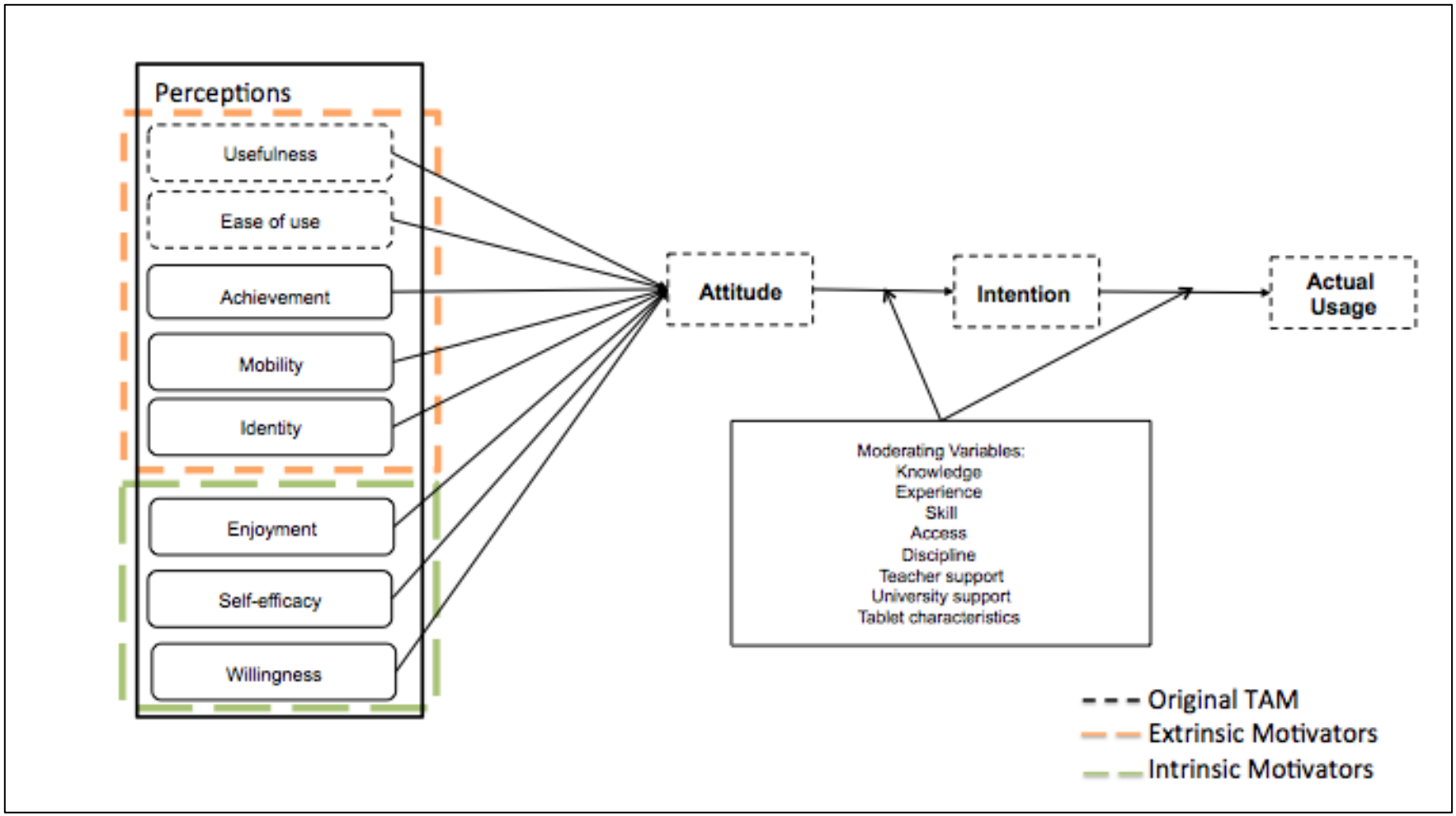

Figure 13 The second version of the MALT model

4.4.2 The Model Constructs

All the factors used in the model are together termed the model constructs, and as such they are described individually below.

4.4.2.1 Actual Usage

Actual usage refers to the actual use of tablet in learning. Although tablets are not yet used officially in this study context, the interviews revealed that many students are already using their own tablets for learning inside and/or outside the classroom. Thus, actual usage is considered in this second version of the MALT model. Most technology acceptance models and theories suggest that actual usage of a system is influenced by the individual's behavioural intention to use it (Shroff, et al., 2011). The research model considers actual performance as a dependent variable; this is determined by behavioural intention to use a tablet.

4.4.2.2 Behavioural Intention

Behavioural intention refers here to the students' intention to use a tablet in learning (Wu et al., 2011). It indicates the intention of that individual in making a decision, and the behaviour that may result as a consequence of this intention (Khechine et al., 2014). The behavioural intention to use technology is a significant factor that determines whether the system is actually used or not (Davis et al.,1989; Fishbein & Ajzen, 1975; Khechine et al., 2014; Leng et al., 2011). For example, Yi and Hwang (2003) discovered a direct and significant influence between behavioural intention and actual usage of the web-based environment (Shroff et al., 2011) as does most of technology acceptance models (TAM). In all technology acceptance models and theories, behavioural intention is a factor. According to Ajzen (1991), an intention is assumed to capture the motivational factors that affect behaviour. Thus, the factors that influence intention to use tablets in this study are either intrinsic or extrinsic motivational factors. The interviews revealed that most students intend to use tablets in their learning and so intention is kept in the second version of the model.

4.4.2.3 Attitude

Although there is no single definition of attitude which can satisfy everyone (Ball, 1977), it refers here to the learners' like or dislike of tablet use for learning. There are a number of factors that relate to perception which can predict learners' attitudes towards adopting tablet use in learning. The original (TAM) theory predicts and explains that intention to use technology is predicted by

attitude, and the theory of reasoned action (TRA) examines the relationship between beliefs and attitude, which has also been the subject of psychological research.

In the study by Shroff et al., no statistically significant relationship was found between perceived usefulness, attitude towards usage and behavioural intention to use the e-portfolio system (Shroff et al., 2011). Moreover, Davis et al. (1989) discovered that the role of attitude towards usage was only a modest predictor of technology acceptance and it is probable that people may use a technology even if they do not have a positive attitude towards it, as long as they believe it to be useful or easy to use (Shroff et al., 2011). Teo and Schalk (2009) supported this, as they found that attitude towards using computers did not have a significant effect on the intention to use. Moreover, some technology acceptance models have omitted the factor of attitude, such as extension of technology acceptance model (TAM2) and unified theory of acceptance and use of technology UTAUT. Venkatesh and colleagues omitted the concept of attitude from the technology acceptance model (Venkatesh & Bala, 2008; Venkatesh et al., 2003) arguing that the role of attitude in explaining behavioural intention or actual usage behaviour is very narrow.

On the other hand, studying attitude is essential because it can predict an individual response to an object (Ajzen, 1991; Fishbein & Ajzen, 1975). Moreover, personal attitude is thought to be a main determinant of individual's usage of technology. In other words, understanding users' attitudes toward m-learning facilitates its implementation (Liaw & Huang, 2011). A study by Cheung and Lee (2011) showed that attitude has the strongest direct influence on behavioural intention.

In addition, Baker (1992) argued for the importance of attitude as an indicator of a user's thoughts and preferences. Interestingly, attitude is considered as one of the affective variables in the success of integrating technology in second or foreign language learning processes (Afshari et al., 2013). Students' attitudes to using technology can influence the intention to integrate technology into learning. The findings of a study by Adewole-Odeshi (2014) showed that all the participating students had positive attitudes towards e-learning as they felt confident in using computers, enjoyed using technology in their learning, and fundamentally perceived the benefits of e-learning. The study also found that attitudes toward technology played an important role in students' acceptance and adoption of the computer as a learning tool in the classroom and in future behaviour using a computer (Teo, 2006). Furthermore, Elias et al. (2012) recommended a thorough understanding of attitudes towards technology use as it is an essential component for study that investigates technological innovation and implementation.

Attitude has long been identified as a cause of intention (Davis, 1989; Fishbein & Ajzen, 1975; Leng et al., 2011). From the responses in the interviews, students recognise the importance of attitude

in influencing their decisions about using tablets. Therefore, attitude in this model is considered as a mediating variable between perceptions and intention to use a tablet in learning and is influenced by intrinsic and extrinsic motivational factors.

4.4.2.4 Perceptions

Perception refers to the sensory understanding of tablet use. Liu (2009) noted that participants' perception of technology was the biggest factor in predicting their attitudes towards it. According to Liaw and Huang (2011) the measurement of m-learning acceptance needs to include different kinds of users' perceptions to form a useful analytic instrument. Users' perceptions change over time as they gain more experience (Mtebe & Raisamo, 2014; Venkatesh et al., 2003). Hence, the findings relating to perceptions in this study should be considered as students' perceptions and intention to use tablets in learning at a single point in time. There are eight factors relating to perception in this model: willingness, self-efficacy, enjoyment, identity, usefulness, ease of use, mobility and achievement. The first three refer to intrinsic motivation and the last five refer to extrinsic motivation.

- **Willingness**

Perceived willingness refers to the degree to which learners perceive that they have the interests and eagerness to use a tablet for learning. It is well-known that individuals will learn or do well if they are interested, and they will not learn or perform if they are uninterested (Pintrich & Schunk, 2002). Thus, it is essential to note that interest refers to more than just positive feelings of enjoyment when doing a task, and includes cognition. The willingness within a person causes them to act (Shanks, 2007). Perceived willingness is considered as intrinsic motivation in this model. Motivation is explained in a classroom environment as arising out of students' subjective experiences and is demonstrated, for example, by their willingness to participate in class activities and their reasons for doing this (Cheng & Yeh, 2009). One of the attitudinal barriers to the implementation of web-based teaching by university teachers is their unwillingness to work with technology (Pajo & Wallace, 2001).

The interviews data showed that many of the higher education students perceived that willingness to use a tablet in learning is an important stage in accepting tablet use in learning. Thus, based on the interviews results, this study theorises that perceived willingness, which is considered as intrinsic motivation, has an effect on students' attitudes towards using tablets in their learning.

- **Self-efficacy**

Self-efficacy is defined as "people's judgments of their capabilities to organise and execute courses of actions required to attain designated types of performance" (Bandura, 1986:391). In this study, perceived self-efficacy refers to the degree to which learners perceive that they have the ability to use a tablet for learning. Self-efficacy refers to a "person's judgment of their capabilities to organise and execute courses of action required to achieve specific goals." (Teo, 2009:83). In other words, perceived self-efficacy shows how much learners believe that they can use a tablet efficiently. The perception of self-efficacy is a reflection of learners' intrinsic motivation based on his or her ability (Yi & Hwang, 2003). Moreover, Zimmerman (2000) pointed out that students' perceptions of their self-efficacy in their academic ability play a vital role in their motivation to achieve. The motivational impact of self-efficacy can be dramatic (Bandura, 1986, 1989), as when individuals perceive their self-efficacy to be high, they will engage in tasks (Pintrich & Schunk, 2002). Thus, perceived self-efficacy is considered as an intrinsic motivation factor.

One of the most interesting results of a study by Park (2009) is that e-learning self-efficacy plays an important role in influencing attitude towards e-learning and behavioural intention to use e-learning. One potential explanation for this may be justified by motivational theory and is that self-efficacy may be considered an intrinsic motivational factor that could help university students self-regulate their motivation for e-learning (Park, 2009). Park measured e-learning self-efficacy by two indicators: confidence in finding information in the e-learning system and the degree of necessary skills for using an e-learning system (Park, 2009). On the other hand, a technology acceptance model examined the effects of self-efficacy on perceived ease of use (Venkatesh & Bala, 2008) but did not assess its role within the full nomological net of TAM (Yi & Hwang, 2003). Computer self-efficacy is an important factor of perceived ease of use (Cheung & Lee, 2011).

The perception of self-efficacy is a reflection of individuals' internal motivation based on his or her ability (Yi & Hwang, 2003). Some studies have provided empirical support for the relationship between self-efficacy and technology use. Hill et al. (1987) found that computer self-efficacy is an important factor in a user's decision to use computer technology. In a different study, Compeau and Higgins (1995) showed that self-efficacy plays an important role in determining technology usage, both directly and through outcome expectations. Moreover, Zimmerman (2000) pointed out that students' perceptions of their academic ability play a vital role in their motivation to achieve. Igbaria and Iivari (1995), on the other hand, discovered that self-efficacy has an insignificant direct effect on perceived usefulness, but a strong indirect effect on perceived ease of use (Lopez & Manson, 1997). Thus it is important to consider this factor when studying the adoption of a new technology. Self-efficacy influences choice of activities (Pintrich & Schunk, 2002). Individuals who

have low self-efficacy for accomplishing a task may avoid doing it, whereas those who perceive they have the ability are likely to complete a task. The data collected in the interviews showed that many of the students perceived that self-efficacy was important to tablet use in learning. Thus, this study theorises that perceived self-efficacy, which is considered as intrinsic motivation, has an effect on students' attitudes towards using tablets in their learning.

- **Enjoyment**

Perceived enjoyment refers to the degree to which learners perceive that they have fun when using a tablet for learning. Bertrand and Bouchard (2008) dealt with perceived enjoyment as an intrinsic motivating factor in computer use. In their work, intrinsic motivation refers to the perception of pleasure felt while using a technology and this has been shown to play an important role in determining technology acceptance and use. The enjoyment factor (Davis et al., 1989; Fishbein and Aijzen, 1975; Khechine et al., 2014) is used to represent intrinsic motivation when exploring how intrinsic motivators affect an individual's technology acceptance behaviour (Leng et al., 2011). In other words, when a technology is fun and a pleasure to use, users will be intrinsically motivated to adopt it. Thus, perceived enjoyment is considered as an intrinsic motivation factor. Perceived enjoyment has been considered as intrinsic motivation because of its focus on actions rather than goals and seeing the product as an end in itself (Liaw & Huang, 2011).

There are a number of studies of technology acceptance models which deal with perceived enjoyment in relation to either perceived ease of use or behavioural intention (Venkatesh & Davis 2000; Yi & Hwang 2003). However, no study has yet dealt with this in terms of its effect on attitude. In this model, perceived enjoyment is a predictor of attitude towards using a technology. Students mentioned that they have fun and enjoy using tablets in learning in the interviews and hence, this study theorises that perceived enjoyment, which is considered as intrinsic motivation, has an effect on students' attitudes towards using tablets in their learning.

- **Ease of use**

Perceived ease of use refers to the degree to which learners perceive that a tablet is easy to use and effort-free. Perceived ease of use in this context is a measure of how comfortable students feel when using tablet computers, for example in the way they use it to search information or find it convenient to carry. As learners use tablets because they are easy to use and free of effort, perceived ease of use is considered as extrinsic motivation based on the categories identified in other studies (Lee et al., 2005).

In the beginning stages of learning to use a new technology, users can often experience difficulties. Once they have become familiar with the technology, the perceived ease of use becomes stronger

(Khechine et al., 2014). Perceived ease of use has been a factor in all technology acceptance models and theories and is known later as effort expectancy. Since the majority of researchers have used this concept in examining users' acceptance of technology, it has also been included in this study model (MALT). Perceived ease of use in this context is a measure of how comfortable students feel when using tablet technology; this is likely to be higher if they usually use it in their everyday lives. The students' interviews data and the existing literature both support the view that tablets are easy to use in the context of learning, and so this study theorises that perceived ease of use, which is considered as extrinsic motivation, has an effect on students' attitudes towards using tablets in their learning.

- **Identity**

Perceived identity refers to the degree to which the learners perceive that they will be viewed as up-to-date and fashionable as a result of their using tablets in learning. Identity here refers to how learners see themselves socially and digitally and can include the need for prestige, high reputation and being seen as independent and modern. As extrinsic motivation refers to doing something because it leads to a valued external outcome such as being socially and digitally recognised, perceived identity is considered as extrinsic motivation in this model.

Social identity refers to social belonging. Belonging to a group is useful to individuals as it provides support and encouragement in times of need (Ernst et al., 2013). A study found that there is a positive relationship between the use of social media and sense of belonging to the community (Damásio et al., 2012). Sense of belonging can also predict behaviour in a workplace (Chan, 2011). Moreover, the influence of peers can play a vital role in the individual's development and this has an effect on motivation levels (Pintrich & Schunk, 2002). Blader & Tyler (2009) stated that social identity is an important determinant of behaviour in organisational settings because it provides a critical pathway through which other workplace factors affect behaviour. In the interviews the students commented that they would like to increase their status and popularity among friends and that this can be achieved by using tablet computers.

Digital identity refers to learners perceiving themselves as modern and as digital natives. According to Prensky (2001), today's students have changed their brain identities with new input which makes them think in a different way. It is important to know whether today's students are digital natives so that the organisation as well as educators know how to deal with them (Al-Husain & Hammo, 2015; Almarwani, 2011; Prensky, 2001). New technologies have been a defining feature in the lives of younger generations, causing a major change in the way they communicate, socialise, create and learn, and this shift has profound implications for education (Helsper & Eynon, 2009). Although there is some debate about using the term digital native, the results of the students' interviews

showed that they generally had a positive attitude towards using tablet in learning, and they wanted to be considered as modern students. Thus, this model assumes that digital identity may influence students' attitudes towards the use of tablet computers. Thus, based on the interviews results, this study theorises that perceived identity, which is considered as extrinsic motivation, has an effect on students' attitudes towards using tablets in their learning.

- **Usefulness**

Perceived usefulness refers to the degree to which learners perceive that using a tablet will enhance their learning. Usefulness is a concept that measures how much individuals perceive their productivity and effectiveness to have improved because of the technology (Yi & Hwang, 2003). In other words, technology can enhance students' performance if they are more productive when using technology. It is one of the most important factors in TAM and has been used by many information system investigators. Yoo et al. (2012) discovered that the extrinsic motivation factor of perceived usefulness directly affects the intention to use and therefore actual behaviour. Moreover, the TAM suggests that perceived usefulness is the strongest predictor of an individual's attitude and intention to use information technology (Davis, 1989; Venkatesh and Davis, 2000; Venkatesh et al., 2003). The majority of contemporary researchers have used this concept to examine users' acceptance of technology and it is viewed as a form of extrinsic motivation. Thus, in this study, perceived usefulness is considered as a factor in extrinsic motivation. Thus, the usefulness of technology has a positive impact on students' attitudes towards using tablet computers in their learning.

There are a number of studies which have shown that perceived usefulness is an important antecedent of computer utilisation (Davis et al., 1989; Igbaria & Iivari, 1995). In these studies, perceived usefulness has been confirmed as the stronger of the two TAM variables, with perceived ease of use yielding mixed and inconclusive results. Taylor and Todd (1995) recently examined a decomposed TPB model, in which they discovered that for business environments, perceived usefulness had a strong direct influence on an individual's intention to utilise an ICT and so they give support to the argument of Davis et al. (1989) that in a real work environment, behavioural intentions are based mainly on performance-related elements, rather than on the users' attitude towards the behaviour (Lopez & Manson, 1997; Taylor & Todd, 1995). In this research, however, I examine whether perceived usefulness influences attitudes towards tablet use. Perceived usefulness was considered in this model because it has featured in all of the technology acceptance models and theories, (although the name of this factor was later changed to performance expectancy) and also because most of the students considered tablets to be useful in many aspects of learning. Hence, based on the interviews results and existing literature, this study theorises that

perceived usefulness, which is considered as extrinsic motivation, has an effect on students' attitudes towards using tablets in their learning.

- **Mobility**

Perceived mobility refers to the degree to which learners perceive that a tablet is portable or movable. In other words, students can use this kind of technology whenever they want to, wherever they are, for whatever subject they are studying. Martin et al. (2013) have researched students' motivation to adopt m-learning and reported that mobility was the main motivator. Aziz (2015) found that perceived mobility was one of the key factors that influenced students' intentions to continue using smart devices in their learning at Stockholm University. Mobility is considered as extrinsic motivation in this model, since using a tablet in learning leads to a valued outcome, which is learning whenever, wherever, and whichever subject learners want. According to the interviews results, most students realised that tablets can provide them with greater mobility, meaning that these devices enable them to study any subject, anywhere and anytime and so many students showed a positive attitude towards tablet use in learning because of its mobility. Thus, based on the interviews results, this study theorises that perceived mobility, which is considered as extrinsic motivation, has an effect on students' attitudes towards using tablets in their learning.

- **Achievement**

Perceived achievement refers to the degree to which learners perceive that using a tablet will lead to better grades. According to the interviews responses, another factor involved in how tablets are perceived in learning is achievement. Many students pointed out that tablets can help them to achieve more. Many studies proved that the use of ICT can influence students' achievements. In an experimental study by Flanagan (2008) showed that achievement in maths rose and assessment grades increased due to the presence of technology. Johnson (2014) concluded that the use of technologies may improve students' achievement. Classrooms around the world believe in the use of technology and so have implemented many forms of technologies to enhance students' interest and achievement (Flanagan, 2008).

Extrinsic motivation refers to motivation that comes from outside rewards, such as money or grades (Yahaya et al., 2010). Here, achievement refers to students gaining better grades by using tablets in their learning and so achievement is considered as extrinsic motivation. Thus, based on the interviews results, this study theorises that perceived achievement, which is considered as extrinsic motivation, has an effect on students' attitudes towards using tablets in their learning.

4.4.2.5 Moderating Variables

A moderating variable is a third variable that affects the relationship between two variables. This study uses eight moderating variables: experience, skills, knowledge, discipline, university support, teacher support, tablet characteristics and access. In the MALT model (version 1) facility has been considered as a moderating variable, which refers to all the resources and support available to students, however, in MALT model (version2) which based on students' responses, I decided to divide facility to three variables which are, university support, teacher support and tablet characteristics.

- **University support**

University support refers to support given by the university in providing the facilities necessary to support students' use of tablets. These facilities are part of the organisational support which enables and encourages tablet use in education (Venkatesh & Bala, 2008). A number of studies have found that the type and quality of facilities are significant in predicting intention to use technologies (Taiwo & Downe, 2013). According to Pajo and Wallace (2001), the organisational barriers identified in implementing web-based teaching by university teachers are that of inadequate technical support, hardware, software, instructional design, and no recognition of the value of online teaching. This study recognises university support as one of the moderating variables in the MALT model based on the literature and students' interviews results.

- **Teacher support**

Teacher support refers to teacher supports and encourages of learners to use tablets for learning. The support of the teacher is important in predicting motivation and acceptance with regard to tablet use in education. Based on the students' interviews, whether or not the teacher supports and encourages students to use tablets to complete learning tasks has an effect on how they perceive technology in the classroom. Martin et al. (2013) have pointed out that some studies indicate that technological innovations are more likely to be embraced by students than by their lecturers or teachers, and that this may affect students' perceptions of using technology to support their learning. They also stated that one of the main factors influencing students' perceptions of the value of technology in their academic success was their lecturer's motivation to use the technology as well as the quality of their lecturer's use of technology for teaching. It is generally thought that digital technology engages and motivates young people (Higgins et al., 2012). One of the ways that technologies can increase students' achievement is by training teachers to use these technologies (Carrillo et al., 2010). If teachers can learn to apply technologies in the classroom, students' learning outcomes may be improved (Johnson, 2014). According to Liu (2009), the reason

that students have difficulty in integrating ICT tools into English learning is the lack of professional assistance from teachers. This lack of help can prove to be a great barrier to learning with technology both inside and outside the classroom. It has been argued recently that teachers can affect students' motivation in many ways (Pintrich & Schunk, 2002). This study recognises that lack of support by teachers can be a moderating variable in the MALT model.

- **Tablet Characteristics**

Tablet characteristics are the salient features of a tablet that can help or hinder learners to use it for learning. Tablet characteristics can positively influence learners' acceptance of its use. Since the particular characteristics of tablets will influence learners' decisions to use them (Alqhtani et al., 2013) and based on the students' interviews, tablet characteristics are considered as a moderating variable in the MALT model.

- **Experience**

Experience refers to expertise in using tablets for learning. It means how much experience a learner has in using a tablet. Experience is a significant moderating variable in technology adoption contexts (Legris et al., 2003) because, as proposed in previous research, users' reactions towards a technology may change over time (Venkatesh & Bala, 2008). Hence, it is essential to understand the role of experience in tablet adoption and use. Venkatesh et al. (2012) mentioned three different moderating variables of gender, age and experience. What they found is that in contrast with age and gender, experience can have a moderating influence on behavioural intention. This is because when consumers have less experience, the impacts of age and gender on consumer learning will be more significant than when they have acquired enough knowledge or expertise about the technology (it means when they have more experience) (Venkatesh & Xu, 2012). According to the literature and based on the students' interviews, experience is considered as a moderating variable in the MALT model.

- **Skill**

Skill is defined as the learned ability to use a tablet. Galletta found that when training users, an important expectation of the training was that the users would return to their jobs with new skills. It was also expected that their subsequent use of the system would result in immediate improvements in effectiveness and productivity (Galletta, 1999). Moreover, Black & Lynch.(2001) stated that if students have the essential skills, they will have the ability to use the technology. This means that skills play an important role in technology acceptance, and that students should have computer skills to enhance their technology usage. One of the barriers that Pajo & Wallace (2001)

identified in a study of the implementation of web-based teaching by university teachers is their lack of technological skills. According to the literature and based on students' interview, skill is considered as a moderating variable in the MALT model.

- **Knowledge**

Knowledge refers to what students know about tablets and their use for learning. One of the barriers that Pajo and Wallace (2001) identified when studying the implementation of web-based teaching by university teachers is their lack of knowledge in this area. Based on the students' interviews, knowledge is considered as a moderating variable in the MALT model.

- **Discipline**

Discipline refers here to the department in which students are registered, or the main subjects of their degree courses. Most technology acceptance models have focused on technology-related factors like ease of use and perceived usefulness. However, academic discipline is a non-technology related factor that influences tablet use in higher education. Orji (2010) tested the unified theory of technology acceptance and use of technology by adding academic discipline and using structural equation model (SEM) analysis. The study showed that the variables influencing acceptance varied between the three academic disciplines investigated (Art and Science, Engineering, and Social Science). In other words, it means that different academic disciplines may have different effects on users' technology acceptance. On the other hand, Pynoo et al. (2011) showed that there is no real need to deploy separate strategies per faculty. However, their study dealt mainly with engineering and medical faculties. In the context of this study, there are only two academic disciplines; one is natural science and the other is social science. I take the view that discipline can be a moderating variable in the MALT model, based on the literature and students' interviews.

- **Access**

Access refers to internet access when using the tablet for learning. In a study by Park (2009), almost 95% of those in the sample had high-speed internet at home and therefore, in this case, university provision of computer access was not an issue (Park, 2009). However, one of the attitudinal barriers that Pajo and Wallace (2001) identified when implementing web-based teaching by university teachers is their concern about student access to the internet. Mehdipour & Zerehkafi (2013) reported that the size of mobile devices and failure of wireless Internet (Wi-Fi) connectivity are problems of m-learning and can cause frustration and disappointment to students. In order to implement mobile devices in classrooms, there is a need of a wireless so as to get the actual benefit

from this implementation (Ali, 2012). This study considers Internet access at university, based on the students' interviews, as a moderating variable in the MALT model.

4.5 Summary

This chapter has presented the results of the interview with students. It also introduced the second version of the *Motivation and Acceptance of Learning with Tablet* (MALT) model, which has been developed based on the data from interviews with twenty students. All of the constructs have been defined and some of the studies relating to these have been reviewed.

Based on thematic analysis of students interview result, there are 11 factors in the motivation and acceptance of learning with tablet MALT model. Actual performance is the dependent variable. There are two other variables, which are attitude toward tablet use and behavioural intention to use a tablet. The model also features eight factors relating to perception; the first five are usefulness, ease of use, identity, mobility and achievement (considered as extrinsic motivation) and the last three are self-efficacy, enjoyment and willingness (considered as intrinsic motivation). As well, there are eight moderating variables: experience, skill, access, knowledge, discipline, university support, teacher support and tablet characteristics. Students use the tablets for learning inside and outside the classrooms.

In the next chapter, this model will be verified by analysing the data from the students' questionnaire using exploratory and confirmatory factor analysis, and structural equation modelling, in the second phase of data collection.

Chapter 5: Phase Two: Verification of the Model

This chapter analyses the findings from the student questionnaires and presents the results of the exploratory and confirmatory factor analysis as well as the structural equation modelling. The results of the hypothesis tests are included. Moreover, the qualitative results of the open-ended questionnaire are presented.

5.1 Introduction

The original planned method involved an initial questionnaire which was mostly based on students' interview responses and theoretical constructs, and this is detailed in Appendix D.1. The data analysis results of this questionnaire proved inconclusive, although it raised some issues which were useful in designing the main questionnaire. The data for this study were based on a revised questionnaire, drawing the main items from the literature and the constructs from the students' interview responses. The main questionnaire contained qualitative, open questions to identify the reasons why some students did not use tablets in their learning as well as students' preferred ways of using tablets for learning, and provided clarification of their attitudes towards tablet use for learning and their intention to use tablets in their learning in their future. The main questionnaire in English can be found in (Appendix D.2) and the Arabic version in (Appendix D.3).

Together with a technology acceptance model (TAM) expert who used TAM in most of her researches, I attempted to match the themes emerging from students' interview responses with the constructs in the TAM models and theories. It was concluded that the themes of usefulness, ease of use, attitude, behavioural intention, actual usage, enjoyment and self-efficacy matched the constructs existing in the TAM literature. However, the theme of identity needed to be replaced by that of image. Moreover, willingness, achievement and mobility do not exist in the TAM literature and do not match with other TAM constructs. Hence, these three constructs needed to include their items based on students' responses. This main questionnaire (instrument) then adopted most of the items from previous studies and a few that were created based on the students' interviews responses. The first draft was reviewed and revised based on feedback from a panel of experts and from pilots, using the same sample. Details of piloting the questionnaire are given in chapter 3 section 3.5.2.3. The questionnaire was created in order to answer the research questions (see heading 1.6).

5.2 Demographic Characteristics of Participants

The demographic characteristics of participants' gender, age and education are not included as the questionnaire was distributed only to female students, of the same age as undergraduate students. Full-time undergraduates in Kingdom of Saudi Arabia (KSA) are in the age range of 19 to 25.

5.2.1 Discipline

Table 3 shows that 135 participants (45%) were studying social science disciplines while 168 participants (55%) were studying natural sciences. This represents undergraduate students at King Abdulaziz University (KAU) as they register in only one of these disciplines.

Table 3 Discipline results

		Frequency	Percentage
Valid	1 Social	135	45
	2 Natural	168	55
	Total	303	100

5.2.2 Experience

Table 4 shows that majority of the respondents had more than three years' experience of tablet use (82%), whereas (17%) respondents had less than three years' experience of tablet use.

Table 4 Students experience results

		Frequency	Percentage
Valid	1 less than 3	53	17.5
	2 more then 3	250	82.5
	Total	303	100

5.2.3 Usage

Table 5 shows that all except one of the respondents use tablets for learning. 32% of respondents always use a tablet for learning and 27% use one regularly.

Table 5 Results of frequency of students' Use of tablet

		Frequency	Percentage
Valid	1 Never	1	.3
	2 Very rarely	3	1
	3 Rarely	12	4
	4 Sometimes	47	15.5
	5 Often	59	19.5
	6 Very regularly	84	27.7
	7 Always	97	32
	Total	303	100

5.3 Procedures

A member of the university administrative staff helped me to send the link of the online questionnaire to the chosen sample (i.e. female undergraduate students). One of the reasons for the initial questionnaire leaded to inclusive results was that some of the university email addresses did not belong to students anymore or did not belong to female students. It could be that the students have already graduated from the university but the university still keeps their email addresses or it could be that female students have not provided their own email addresses when they registered at the university. To counter this problem, a question has been added at the beginning of the main questionnaire, asking about “Are you currently a female undergraduate student at KAU?”, to make sure that the questionnaire was sent to the target population.

Students volunteering to take part in the study were asked to answer an online questionnaire. After consenting at the beginning of the questionnaire, they were asked “Are you currently a female undergraduate student at KAU?”. If not, they were directed to leave the questionnaire immediately. If they responded affirmatively, they moved to the second part, in which they were asked to indicate academic discipline and then asked if they used any kind of mobile device in their learning. If the answer was no, they moved to the three open questions:

- “Why do you not use a mobile device for learning? (difficult, boring, expensive, etc.),
- Do you have a positive attitude to using a tablet for learning? If yes, why? If not, why not?”
- “Do you intend to use a tablet for learning? If yes, how? If not, why not?”.

On answering affirmatively, they were then asked about their experience using a tablet for

learning, and then the remainder of the questions were answered using the Likert scale. At the end, they were asked two open questions: “Do you have a positive attitude to using a tablet for learning? If yes, why? If not, why not?” and “Do you intend to use a tablet for learning? If yes, how? If not, why not?” These questions were asked mainly to look for the preferred ways of using tablet for learning but also in case the factor analysis did not run correctly again.

5.4 Participants

A total of 490 undergraduate students participated in the study. Out of this number, 126 (26%) answered negatively to the first question, which identified female undergraduate students currently at KAU. Out of the remaining 364 students, 40 (11%) said they did not use any kind of mobile technology devices for learning. This question needs to be answered qualitatively to answer the RQ of “What are the barriers to tablet use in higher education according to students’ perspectives?”. The rest of the participants (N=324) completed the whole questionnaire.

5.4.1 Missing Data and Unengaged Respondents

There was no missing data in the submission of the main questionnaire. Calculating the standard deviation for the latent variables on the spreadsheet revealed that 21 participants were not completely engaged in the responses, with SD=0.000. They responded either: all strongly disagree, agree, moderately agree, or all strongly agree for all the latent variables, and so their questionnaires were removed. As a result, 303 valid questionnaires remained out of 324 completed questionnaires.

5.5 Exploratory Factor Analysis (EFA)

This section tests the factorial structure by using EFA. It describes the rationale, analysis and results of this step.

5.5.1 Rationale

It is crucial to determine the research purpose before choosing a form of analysis. In deciding that factor analysis was suitable for this study, both exploratory and confirmatory analysis approaches were chosen, as they are appropriate for the research objectives. EFA is appropriate for new scales. Some of the factors appearing in my questionnaire do not feature in existing TAM literature, and they were built based on the interview responses. Although most of the questionnaire items are adopted from previous questionnaires, this study has been applied in a different context and items have been translated to another language, and thus EFA is appropriate for this study.

EFA can be conducted to address theoretical (construct identification) and methodological (measurement construction) questions (Fabrigar & Wegener, 2011) as the contribution of this study involves both of them. Therefore, EFA was used in this study to reach satisfactory conclusions about the number and nature of the key constructs and their items (Fabrigar & Wegener, 2011).

5.5.2 EFA Analysis and Results

Principal component analysis (PCA) is an extraction technique used in EFA. Maximum likelihood (ML) is another extraction technique and has the same algorithm as confirmatory factor analysis (Fabrigar & Wegener, 2011). ML is computationally complex, and in large matrices when reliable variables are used, it produces results only slightly different to simpler solutions (Kline, 1994). In other words, in a large sample size, there is little difference between the principal components and maximum likelihood (Kline, 1994). Nonetheless, ML should be computed when the scree test, which is used to identify the number of factors that can be extracted (Hair et al., 2010), is unclear or where the simple structure has not been found (Kline, 1994). Yet, the main use of this method is in confirmatory analysis. Once an exploratory factor analysis has been completed, researchers are highly encouraged to then verify the results with a confirmatory factor analysis (Fabrigar & Wegener, 2011; Kline, 1994).

PCA was used as the aim of this study is to explore the factors that influence students' motivation and acceptance of tablet use for learning and also to reduce the instrument items. Although this study is based on TAM and self-determination theory (SDT) models, some factors have been added according to students' responds in the first phase. Moreover, PCA is a popular extraction method used by researchers. When PCA and ML have been employed, they give approximately same result. Thus, PCA has been employed in the EFA analysis, which was performed using SPSS (version 24). The first result output for EFA for all the items and constructs is given in appendix E Table 24.

Before using EFA, I needed to examine the normal distribution of the data. In order to assess the normality of the data, kurtosis is identified. It is suggested by Ho & Yu (2011) that the kurtosis of normal distribution should be less than 3. There are 6 kurtosis item factors (>3.0) meaning that there is not a lot of variance in the items Table 6. For example, item Mb1 has a kurtosis value of 5.577, meaning that many participants gave the same answers to this item. It indicates that these six items are not normally distributed.

Table 6 Kurtosis result

Statistics						
	Us2	Mb1	Mb4	Att2	Att3	Att4
Kurtosis	3.342	5.577	5.516	3.375	3.086	3.514

There are two ways to deal with kurtosis, either by transforming the items with kurtosis to z-score, or by dropping the items and seeing how it works (Hair et al., 2010). After deleting the items with kurtosis, the EFA looks better, but there are still items which load on two or more constructs or do not have suitable loading with a construct in term of content validity (i.e. the construct has a different meaning). After deleting the items which loaded on multiple constructs one at a time, and where the difference between the loadings is no more than 0.1, the final EFA for KMO test looks as follows:

Table 7 KMO statistics and Bartlett's test of sphericity

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.930
Bartlett's Test of Sphericity	Approx. Chi-Square	3794.901
	df	190
	Sig.	.000

The factor extraction method used in this study is principal component analysis with five-component extraction. The table shows that the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy value was .930 and Bartlett's Test of Sphericity was significant p = <.001, which indicated the appropriateness of sample data for conducting exploratory factor analysis.

Before trying to interpret factors, it is important to perform a factor rotation (Devellis, 2003). Rotating factors changes the factor loadings as well as the meaning of the factors. There are two types of rotation: orthogonal and oblique. Orthogonal factors are uncorrelated factors which are statistically independent of one another, whereas oblique factors are correlated. If an orthogonal

solution produces a simple structure, the Varimax rotation package is the one to choose, whereas if an oblique rotation gives a better simple structure, the Direct Oblimin package is the one to choose (Kline, 1994). Thus, this study used the orthogonal rotation with Varimax, assuming the factors are uncorrelated, and there was no big difference when Varimax and Direct Oblimin were conducted; they gave similar results. In Varimax, this means that the rotated factors are uncorrelated and the communalities and the ability to reproduce the original correlation matrix are identical to the original factor analysis. It also aims to maximise the sum of variances of squared loadings in the columns of the factor matrix (Kline, 1994).

It is important to know whether a factor loading is significant or not, and it is better to consider the factor loading after rotation (Kline, 1994). In this study, a factor loading of 0.5 indicates significance. The rotated component matrix in appendix E Table 25 shows loadings of each measured item on each of the five latent factors identified in the EFA model. The loading matrix shows that the measured items have high loadings on their hypothesised constructs and other constructs are lower than the minimum criteria of 0.3. In terms of item analysis, the result in appendix E Table 25 shows that the Cronbach's alpha for each construct is more than .7, which is very acceptable.

5.6 Creation of Latent Variables

Many constructs, known as latent variables, cannot be assessed directly, and hence scale items are usually used as a means to the end of construct assessment (Kline, 1994). The items with the highest loadings are the ones that are most similar to the latent variables (Kline, 1994). According to the findings of the EFA, five constructs (latent variables) are extracted. Three constructs have the same names as before, such as behavioural intention, perceived enjoyment, and perceived image (as expert consultation identified the name instead of identity to match previous studies of TAM). However, two constructs combine different items but share similar meaning; these are perceived enablers and perceived value. The former has seven items, three for ease of use, two for self-efficacy and two for mobility. As all of these are used to indicate enablers to use tablets for learning, they have been termed perceived enablers. The latter (perceived value) has four items, three for achievement and one for usefulness. As all of these indicate the value of tablet use for learning, it was decided to name them collectively as perceived value. Table 8shows the codes for the five constructs.

Table 8 The constructs' names and codes

Construct	Code
Behavioural intention	BI

Perceived enjoyment	PEJ
Perceived image	PIM
Perceived enablers	PEN
Perceived value	PV

5.7 Structural Equation Modelling (SEM)

SEM was used in this research to test the fit of the model. More details of SEM are given in Chapter three section 3.5.2.4.2. A two-step approach was taken to produce the final model as recommended by Hair et al. (2010) and Muijs (2004). One is the measurement model and the other is the structural model.

5.7.1 Confirmatory Factor Analysis (CFA) And Measurement Model

CFA is a type of measurement model that deals with the relationships between observed variables (manifest items) and latent variables (factors) (Muijs, 2004). More details of CFA are given in Chapter three section 3.5.2.4.1. The CFA was done on the measurement model, which comprised five factors: perceived image (PIM), perceived enablers (PEN), perceived enjoyment (PEJ), perceived value (PV) and behavioural intention (BI). These factors were measured using a total of 20 items which were derived from the EFA. CFA is used in this study to confirm the factorial structure of the questionnaire, as well as to establish the construct validity of the scale and also to test the model fit. This section describes the rationale followed by the analysis and results.

5.7.1.1 Rationale

Many psychologists consider CFA as a superior method to EFA because it tests hypothesis (Hair et al., 2010; Kline, 1994). In order to confirm that the factorial structure of a scale is sound, both Hair et al. (2010) and Kline (1994) recommend verifying the EFA with a follow-up CFA. Doing so provides stronger support for construct reliability and validity (Devellis, 2003). However, in EFA, the factor extraction method of maximum likelihood gives the same information, such as model fit, standard errors, and statistical tests. Still, when there are very specific hypotheses to be tested regarding model parameters, CFA is more appropriate (Kline, 1994). CFA was performed to assess the uni-dimensionality, reliability, and validity of measures. Two approaches were used, which are consideration of the goodness of fit and evaluation of the reliability and validity of the measurement model (Hair et al., 2010; Muijs, 2004). The measurement model was performed by

using maximum likelihood (ML) estimation techniques provided by a software called AMOS (version 24).

5.7.1.2 Goodness of Fit

Goodness of fit is a measure "indicating how well a specified model reproduces the observed covariance matrix among the indicator variables" (Hair et al., 2010:632). In CFA, goodness of fit tests are very important (Cohen et al., 2011; Kline, 1994; Muijs, 2004) as it is crucial to obtain the best fit of the model. SEM has three main types of fit measure indices: absolute fit indices, incremental fit indices, and parsimonious fit indices (Hair et al., 2010; Hooper et al., 2008). "Absolute fit indices refers to measures of overall goodness-of-fit for both the structural and measurement models. This type of measure does not make any comparison to a specified null model (incremental fit measure) or adjust for the number of parameters in the estimated model (parsimonious fit measure)" (Hair et al., 2010:630). The descriptions of these indices are given in appendix E Table 26. The CFA has been run for the model which was based on the EFA result; Figure 14 shows the CFA result.

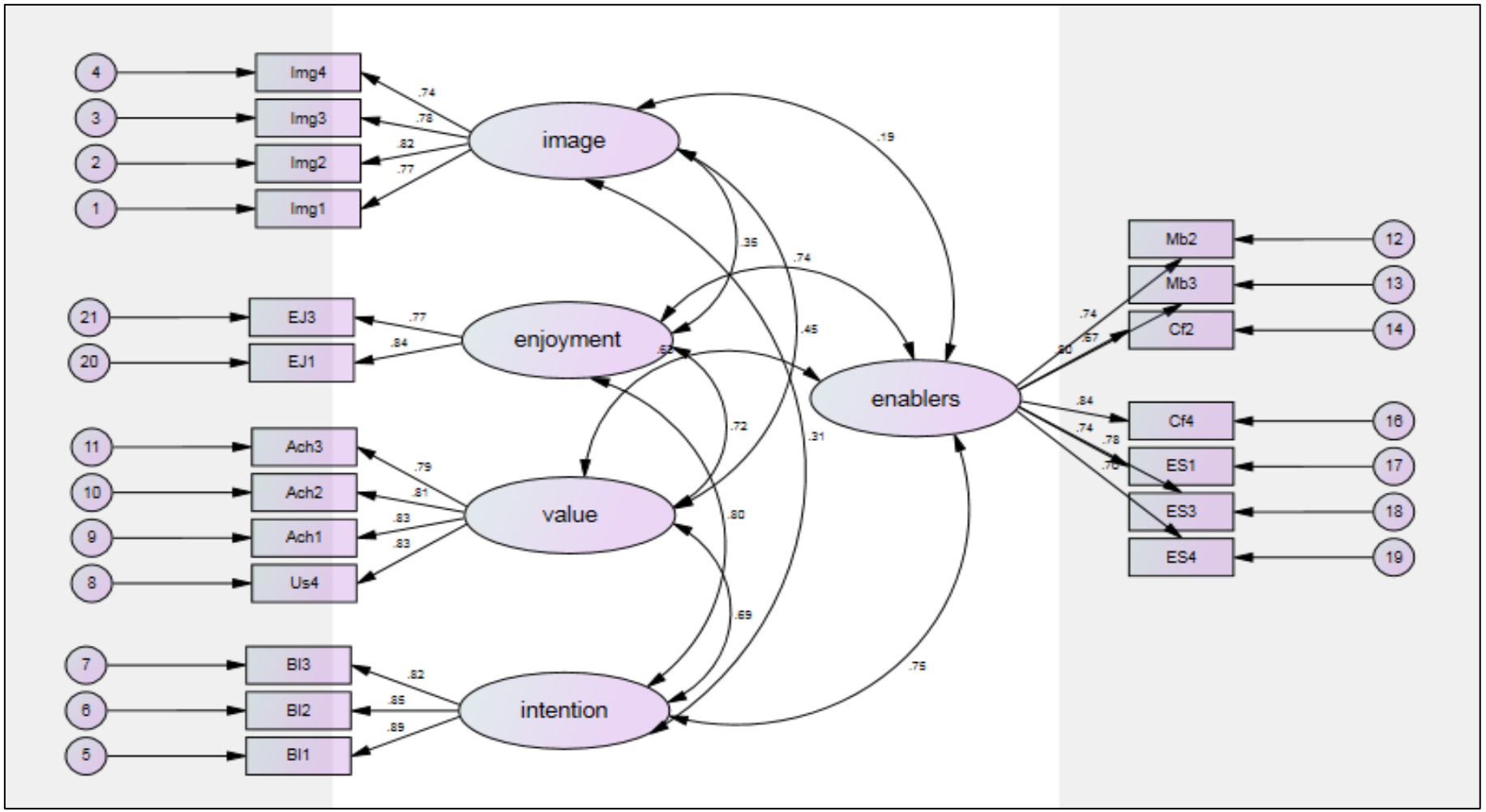

Figure 14 Confirmatory factor analysis

The results of the fit measures obtained and their recommended levels are shown in Table 9. The results indicate that chi-square statistics (χ^2 =271.753,df= 160) are significant at p<0.05, indicating that the fit of the data to the model was not good and should be rejected, as it needs be insignificant to fit the model (Cohen et al., 2011). However, it can be misleading if the result depends only on the chi-square statistics for evaluation of the model specification, as it is sensitive to the sample size (Muijs, 2004), which in this study is 303. Thus, other fit indices such as GFI, AGFI, CFI and RMSEA were used to assess the model fit. The results yielded absolute fit measures of GFI: 0.921, RMSEA: 0.048; incremental fit measures of NFI: 0.930 and CFI: 0.970; and a parsimony fit measure of AGFI: 0.897 which is very close to 0.9. All these measures match the criteria except for the AGFI, which is too close to its criteria limit. Therefore, these goodness of fit measurements confirm that the model adequately fits the data.

Table 9 Results of fit measures

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

Moreover, other estimation criteria showed that the model fits the data adequately, such that standard regression weights were all greater than 0.7. To conclude, the results confirmed that the model fits the data, and so the unidimensionality of the model was established, Unidimensionality is present when "a set of measured indicators can be explained by only one underlying construct" (Hair et al., 2010: 696).

5.7.1.3 Assessment of the reliability and validity of constructs

This section provides the results of the construct reliability and validity of the data (Table 10).

Table 10 Constructs reliability, convergent and discriminant validity

	CR	AVE	PEN	PIM	BI	PV	PEJ
PEN	0.902	0.570	**0.755**				
PIM	0.822	0.607	0.188	**0.779**			
BI	0.889	0.728	0.752	0.309	**0.853**		
PV	0.888	0.665	0.630	0.450	0.693	**0.815**	
PEJ	0.790	0.653	0.740	0.354	0.802	0.719	**0.808**
Note: CR= Construct reliability; AVE= average variance extracted (convergent validity). **The diagonal values are square roots of AVE (discriminant validity).**							

1. Construct reliability (CR)

The reliability of the measures was measured by examining the consistency of the respondents' answers to all items in the measure. This refers to Cronbach's alpha reliability coefficients, which were used to measure the internal consistency of each measure. Therefore, to find out the overall reliability of each of the latent constructs used in the model, construct reliabilities were performed. Construct reliability was calculated by Equation 1 suggested by (Hair et al., 2010) as follows.

Equation 1 Constructs reliability

$$CR = \frac{(\sum_{i=1}^{n} \lambda_i)^2}{(\sum_{i=1}^{n} \lambda_i)^2 + (\sum_{i=1}^{n} \delta_i)}$$

Note: in the formula mentioned above λ represents factor loadings (standardized regression weights) and i represents total number of items, and δ represents the error variance term for each latent construct.

The results in Table 10 show that the reliability coefficient for all of the constructs was above the recommended criteria of >0.7, representing strong reliability and high internal consistency in measuring relationships in the model. Construct reliability must be performed before construct validity is assessed (Hair et al., 2010). The construct reliabilities varied between .790 for perceived enjoyment and .902 for perceived enablers.

2. Construct validity

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

Convergent validity

Convergent validity is indicated by evidence that indicators of a specific construct share a high proportion of variance in common (Brown, 2006; Hair et al., 2010). The average variance extracted (AVE) is "a summary measure of convergence among a set of items representing a latent construct. It is the average percentage of variation explained (variance extracted) among the items of a construct" (Hair et al., 2010: 688). It was computed by using the Equation 2 which suggested by (Hair et al., 2010).

Equation 2 Average variance extracted for convergent validity

$$AVE = \frac{\sum_{i=1}^{n} \lambda_i^2}{n}$$

Note: in the formula mentioned above λ represents factor loadings (standardized regression weights) and i represents the total number of items.

The results of the measurement model demonstrate the convergent validity of the latent constructs used in the model, since the AVE in Table 10 all are above .5.

Discriminant validity

Discriminant validity is indicated by results showing that a construct is truly distinct from others (Brown, 2006; Hair et al., 2010). The discriminant validity was assessed by calculating the squared AVE for each construct. The results shown in Table 10 revealed that the model demonstrated a discriminant validity (based on the square root of AVE) greater than the other correlations in this model. This suggests, therefore, that the measured items have more in common with the latent construct they were associated with than any of the other latent constructs; and so this provides strong support for discriminant validity.

Nomological validity

The nomological validity was tested by examining whether or not the correlations between the constructs in the measurement model make any sense (Hair et al., 2010). The construct correlations

(estimates) were used to assess the nomological validity of the model and results are given in appendix E Table 27 and Table 28. The results indicated that all of the correlations were positive and significant. Generally, the results support the nomological validity (Hair et al., 2010). The CFA results show that the measures used in the measurement model had adequate reliability, convergent, discriminant, and nomological validity.

5.7.2 Structural Model Evaluation And Hypothesis Testing

This section presents, discusses and tests the relationships between the latent constructs. The latent constructs are categorised into two main types: exogenous and endogenous constructs. In terms of path diagram, one or more arrows lead to endogenous constructs (dependent variables), while no arrows lead to exogenous constructs (independent variables) (Hair et al., 2010). The exogenous constructs are perceived enablers and perceived image, while the endogenous constructs are perceived enjoyment, perceived value and behavioural intention. Goodness of fit indices and other parameter estimates were performed to evaluate the hypothesised structural model.

As the purpose of this study is to explore the factors and the significant relationships between them, and as one of the contributions of this research is the MALT model, the paths have been changed many times to make the analysis run properly. This was achieved by looking at the modification indices in the Amos output and removing the path that seemed to be problematic. This process probably provides a better fit to the data, and so the model was revised in order to make it fit the data well. Table 11 shows final paths.

Table 11 Hypothesis Paths

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

5.7.2.1 Model Fit and Hypothesis Evaluation

Model fit was carried out first, followed by checking of the p-value which indicates the significance level. If the p-value is significant but the model fit is not good, it becomes meaningless.

Table 12 Structural model fit measure assessment

	Absolute fit measures				Incremental fit measures		Parsimony fit measure
	χ^2	Df	GFI	RMSEA	NFI	CFI	AGFI
Criteria			≥ 0.90	<0.05	≥ 0.90	≥ 0.90	≥ 0.90
obtained	2.182	2	0.997	0.017	0.997	1.000	0.978

Table 12 shows the fit indices and indicates that the hypothesised structural model provides a good fit to the data. The likelihood ratio chi-square ($\chi 2$ = 2.182; df = 2; p = .336) was not significant (p >.05), which showed that model adequately fits the observed data; moreover, the absolute fit measures i.e. GFI and RMSEA were 0.997 and 0.017 respectively, also indicating good fit. The incremental fit measures i.e. NFI and CFI were 0.997 and 1.000 respectively, which were above the minimum requirement for adequate fit, and the parsimony fit measure (AGFI) was 0.978, which also was above the cut-off point.

Another important part of the structural model assessment is coefficient estimate. This estimate was used to produce the estimated population covariance matrix for the structural model. The model was defined by 20 measurement items that identified the five latent constructs. The covariance matrix among the constructs was applied to test the model. When the critical ratio (CR or t- value) is higher than 1.96 for an estimate (regression weight), then the parameter coefficient value is statistically significant at the .05 level (Hair et al., 2010). Critical ratio or t-value was obtained and seven causal paths were examined in this research study. All the paths were shown to be significant. For six causal paths estimates, the t-values were above the 1.96 critical values at the significant level p >.001. The last causal path estimate t-value was above the 1.96 critical values at the significant level p >.05. The overall structural model is illustrated in Figure 15, and parameter estimates are described in Table 13. It is to be noted that for the sake of clarity, neither the measurement items (indicators) nor error terms associated with latent constructs are shown in the figure below.

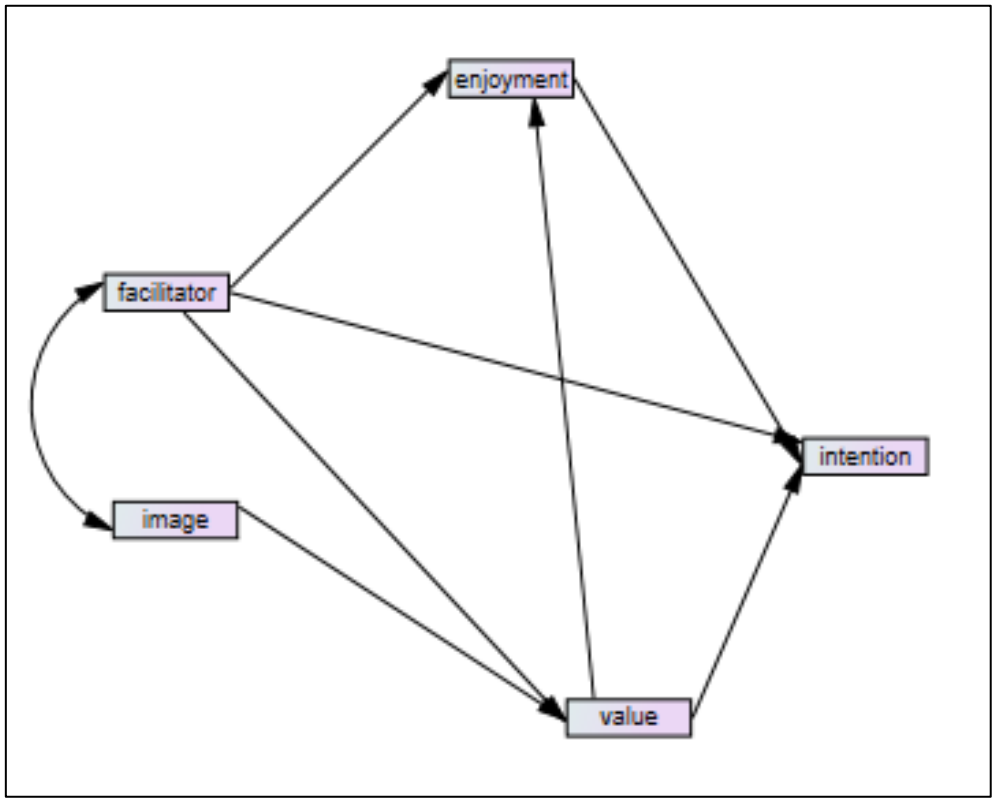

Figure 15 The structural model

Table 13 Regression estimates of latent constructs

			Estimate	S.E.	C.R.	P
value	<---	enablers	1.132	.099	11.488	***
value	<---	image	.256	.029	8.857	***
enjoyment	<---	enablers	.765	.081	9.429	***
enjoyment	<---	value	.329	.039	8.514	***
intention	<---	value	.104	.046	2.281	.023
intention	<---	enjoyment	.540	.061	8.805	***
intention	<---	enablers	.673	.098	6.851	***
Note: Estimate = regression weight; S.E.= standard error; C.R.= critical ratio; P= significance value.						

In testing the structural model hypothesis, the p-value was used to evaluate the statistical significance of the relationship between the latent variables to at least 0.05. The standardised path coefficient (β) indicates the effect of the variable on other variables in the model. The CR can be referred to as the standard normal distribution, therefore, CR values of ≥1.96 and ≤ -1.96 indicate two-sided significance (Hair et al., 2010). Table 14 shows the results of the analysis for all of the MALT model hypotheses.

The results presented in Table 14 revealed that the seven hypothesised paths between independent and dependent variables were significant. For example, the hypothesised path between perceived value and behavioural intention with CR value of 2.281 (>1.96) was statistically significant (p = < 0.05). Moreover, paths between perceived enablers and perceived value; perceived image and perceived value; perceived enablers and perceived enjoyment; perceived value and perceived enjoyment; perceived enjoyment and behavioural intention; perceived enablers and behavioural intention were statistically significant at p =<.001.

Table 14 Hypothesis testing results

Construct	Code	Hypotheses	Path	Beta (β)	CR	P	Hypothesised Relationship (positive)
Perceived Value	PV	H1a.	PV ➔ BI	0.105	2.281	0.023	Yes
		H1b.	PV ➔ PEJ	0.392	8.514	***	Yes
Perceived enjoyment	PEJ	H2.	PEJ ➔ BI	0.457	8.805	***	Yes
Perceived enablers	PEN	H3a.	PEN ➔ BI	0.323	6.851	***	Yes
		H3b.	PEN ➔ PEJ	0.434	9.429	***	Yes
		H3c.	PEN ➔ PV	0.539	11.48	***	Yes
Perceived image	PIM	H4.	PIM ➔ PV	0.415	8.857	***	Yes
Note: BI = Behavioural intention (dependent variable in the model). Beta= Standardised regression weight; CR= critical ratio (t-value); P= significance value.							

Thus, in testing the hypotheses, the results indicated that all seven hypotheses were positive and statistically significant. The results suggested that standardised regression estimates for these hypotheses indicated statistical significance. The more significant a correlation is, the more confident the researcher can be that there truly is a relationship between the variables (Kline, 1994). Hence, these hypotheses were supported.

H1a. PV has a significant positive influence on the BI to use a tablet for learning.

As shown in Table 14, the standardised regression weight and critical ratio of PV to BI are 0.105 and 2.281 respectively, suggesting that this path is statistically significant at p=<.05. The results demonstrate support for hypothesis H1a and indicate that perceived value has a significant

influence on behavioural intention to use a tablet for learning, implying that if there was an increase in PV then it would positively influence the user's intention towards acceptance of tablet use in learning. To summarise, these results further suggest that PV is a determinant of behavioural intention to use a tablet for learning.

H1b. PV has a significant positive influence on PEJ of using a tablet for learning.

As shown in Table 14, the standardised regression weight and critical ratio of PV to PEJ are 0.392 and 8.514 respectively, suggesting that this path is statistically significant at p=<.001. The results demonstrate support for hypothesis H1b, indicating that perceived value has a significant influence on perceived enjoyment of using a tablet for learning, implying that if PV increases, the user is likely to perceive that using a tablet for learning is enjoyable. To summarise, these results further suggest that PV is a determinant of perceived enjoyment in using a tablet for learning.

H2. PEJ has a significant positive influence on the BI to use a tablet for learning.

As shown in Table 14, the standardised regression weight and critical ratio of PEJ to BI are 0.457 and 8.805 respectively. The results suggest that this path is statistically significant at p=< .001. Thus, the results demonstrate support for hypothesis H2, indicating that perceived enjoyment has a significant influence on behavioural intention to use a tablet for learning. This implies that an increase in PEJ would positively influence the user's intention to accept using a tablet for learning. To summarise, these results further suggest that PEJ is a strong determinant of behavioural intention to use a tablet for learning.

H3a. PEN has a significant positive influence on the BI to use a tablet for learning.

As shown in Table 14, the standardised regression weight and critical ratio of PEN to BI are 0.323 and 6.851 respectively. The results suggest that this path is statistically significant at p=< .001. Thus the results demonstrate support for hypothesis H3a, indicating that perceived enablers has a significant influence on behavioural intention to use a tablet for learning. This implies that an increase in PEN would positively influence the user's intention to accept using a tablet for learning. To summarise, these results further suggest that PEN is a strong determinant of behavioural intention to use a tablet for learning.

H3b. PEN has a significant positive influence on PEJ of using a tablet for learning.

As shown in Table 14, the standardised regression weight and critical ratio of PEN to PEJ are 0.434 and 9.429 respectively. The results suggest that this path is statistically significant at p=<.001. Thus the results demonstrate support for hypothesis H3b, indicating that perceived enablers has a

significant influence on perceived enjoyment of using a tablet for learning. This implies that if PEN increases, then the user is likely to perceive that using a tablet for learning is enjoyable. To summarise, these results further suggest that PEN is a strong determinant of PEJ in using a tablet for learning.

H3c. PEN has a significant positive influence on PV of using a tablet for learning.

As shown in Table 14, the standardised regression weight and critical ratio of PEN to PV are 0.539 and 11.488 respectively. The results suggest that this path is statistically significant at p=< .001. Thus the results demonstrate support for hypothesis H3c, indicating that perceived enablers has a significant influence on PV in using a tablet for learning. This implies that if PEN increases then the user is likely to perceive that using a tablet for learning is valuable. To summarise, these results suggest that PEN is a strong determinant of perceived value in using a tablet for learning.

H4. PIM has a significant positive influence on the PV to use tablet for learning.

As shown in Table 14, the standardised regression weight and critical ratio of PIM to PV are 0.415 and 8.857 respectively. The results suggest that this path is statistically significant at p=<.001. Thus the results demonstrate support for hypothesis H4, indicating that perceived image has a significant influence on PV of using a tablet for learning. This implies that if PIM increases then the user is likely to perceive that using a tablet for learning is valuable. To summarise, these results further suggest that PIM is a strong determinant of perceived value in using a tablet for learning.

5.7.2.1.1 Mediation and Moderator Hypotheses

Mediation Factors

The mediation effect refers to “the effect of a third construct intervening between the two related constructs” (Hair et al., 2010:690).

Table 15 Mediation hypotheses results

Hypotheses	Estimate	P
H5a.	.413	.001
H5b.	.178	.001
H6a.	.118	.037
H6b.	.027	.033
Note: Estimate = regression weight; P = significance level.		

Mediation hypothesis tests

H5a. PEJ mediates the positive influence of PEN and BI to use a tablet for learning.

As shown in Table 15, the regression weight and p-value of PEJ as a mediation factor of PEN and BI are 0.413 and .001 respectively. In addition, the model fit is good and the p-value is significant at p=<.01. The results reveal support for hypothesis H5a and indicate that PEJ is a mediation factor of PEN and BI to use a tablet for learning. To summarise, these results further suggest that PEJ is a mediation determinant of perceived enablers and behavioural intention to use a tablet for learning.

H5b. PEJ mediates the positive influence of PV and BI to use a tablet for learning.

As shown in Table 15, the regression weight and p-value of PEJ as a mediation factor of PV and BI are 0.178 and .001 respectively. Moreover, the model fit is good and the p-value is significant at p=<.01. The results revealed support for hypothesis H5b and indicate that PEJ is a mediation factor of PV and BI to use a tablet for learning. To summarise, these results further suggest that PEJ is a mediation determinant of perceived value and behavioural intention to use a tablet for learning.

H6a. PV mediates the positive influence of PEN and BI to use tablet for learning.

As shown in Table 15, the regression weight and p-value of PV as a mediation factor of PEN and BI are 0.118 and .037 respectively. In addition, the model fit is good and the p-value is significant at p=<.05. The results reveal support for hypothesis H6a, indicating that PV is a mediation factor of PEN and BI to use a tablet for learning. To summarise, these results further suggest that PV is a mediation determinant of perceived enablers and behavioural intention to use a tablet for learning.

H6b. PV mediates the positive influence of PIM and BI to use a tablet for learning.

As shown in Table 15, the regression weight and p-value of PV as a mediation factor of PIM and BI are 0.027 and .033 respectively. Moreover, the model fit is good and the p-value is significant at p=<.05. The results reveal support for hypothesis H6b, indicating that PV is a mediation factor of PIM and BI to use a tablet for learning. To summarise, these results further suggest that PV is a mediation determinant of perceived image and behavioural intention to use a tablet for learning.

Moderator Factors

Moderating effect refers to “the effect of a third construct changing the relationship between two related constructs” (Hair et al., 2010:690).

Moderation Hypothesis tests

Based on the literature and the interview results, this study identifies eight moderating variables (details in Chapter 4:). These are access, university support, teacher support, tablet characteristics,

knowledge, skill, discipline and experience. Out of these eight factors, only access and teacher support are considered as moderators in this model, based on SEM analysis.

Interaction moderation hypothesis tests

Interaction effect means "the difference between groups on one treatment variable varies depending on the level on the second treatment variable" (Hair et al., 2010:441).

Table 16 Interaction moderation hypothesis tests

Hypotheses	Estimate	CR	P
H7a.	.081	2.943	.003
H7b.	.077	2.326	.020
H8.	-.087	-3.322	***
Note: Estimate= regression weight; CR=critical ratio; P= significance level.			

H7a. Access moderates the positive relationship between PEJ and BI to use a tablet for learning.

As shown in Table 16, the regression weight, critical ratio and p-value of the interaction between perceived enjoyment and access to BI are 0.081, 2.943 and .003 respectively. Furthermore, because the model fit is good and the p-value is significant at p=<.01. This supports hypothesis H7a, indicating that access is a moderating factor of PEJ and BI to use a tablet for learning. The results indicate that access strengthens the positive relationship between PEJ and BI.

H7b. Access moderates the positive relationship between PEN and PV of using a tablet for learning.

As shown in Table 16, the regression weight, critical ratio and p-value for the interaction between perceived enablers and access to PV are 0.077, 2.326 and .020 respectively. Furthermore, because the model fit is good and the p-value is significant at p=<.05. This supports hypothesis H7b, indicating that access is a moderating factor of PEN and PV in using a tablet for learning. The results show that access strengthens the relationship between PEN and PV.

H8. Teacher support moderates the positive relationship between PV and BI to use a tablet for learning.

As shown in Table 16, the regression weight, critical ratio and p-value of the interaction between perceived value and teacher support to BI are -0.087, -3.322 and .000 respectively. Furthermore, because the model fit is good and the p-value is significant at p=<.001. This supports hypothesis H8, indicating that teacher support is a moderating factor of PV and BI to use a tablet for learning. The results indicate that teacher support dampens the relationship between PV and BI.

Chapter 5

Multi-group hypotheses

Multiple group analysis refers to "a form of SEM analysis where two or more samples of respondents are compared using similar models" (Hair et al., 2010:691). Discipline and experience were treated as groups in this model, for the purpose of discovering whether the model is different between the groups.

H9. There is a difference between the discipline groups in the MALT model.

Students of the universities study in one of two disciplines, that of natural science and social science. When students first register at university as undergraduates, they choose either to study social science or natural science in the foundation year, depending on which specific discipline they will be in for the remaining three years.

Table 17 shows that the chi square for model comparison between the two groups of discipline is 12.770; the degree of freedom is 7 and the p-value is 0.078. The results in the table reveal that there is no difference between the two groups at the model level. This hypothesis is not significant (p=>0.05) and hence it is rejected. It indicates there is no statistical difference in the model between the two groups of discipline.

H10. There is a difference between the experience groups in the MALT model.

Experience has two options in the questionnaire; either more than three years, or less than three years. Table 17 shows that the chi square for the model comparison between the two groups of experience is 5.404; the degree of freedom is 7 and the p-value is 0.611. The results in the table show that there is no difference between the two groups at the model level. This hypothesis is not significant (p=>0.05) and hence it is rejected. It indicates that there is no statistical difference in the model between the two groups of experience.

Table 17 Multi-group hypotheses

Hypotheses	χ^2	df	P
H9.	12.770	7	.078
H10.	5.404	7	.611
Note: χ^2 chi square; df= degree of freedom; P= significance value.			

5.7.2.2 Final Check of Model Fit

Table 18 The final check of model fit

	Absolute fit measures				Incremental fit measures		Parsimony fit measure
	χ^2	Df	GFI	RMSEA	NFI	CFI	AGFI
Criteria			≥ 0.90	<0.05	≥ 0.90	≥ 0.90	≥ 0.90
obtained	8.570	11	0.994	0.000	0.990	1.000	0.972

Table 18 shows the fit indices and indicates that the hypothesised structural model provides a good fit with the data. The likelihood ratio chi-square (χ2= 8.570; df =11; p=.662) was not significant (p=>.05), showing that the model adequately fits the observed data; moreover, the absolute fit measures i.e. GFI and RMSEA were 0.994 and 0.000 respectively, also indicating good fit. The incremental fit measures i.e. NFI and CFI were 0.972 and 1.000 respectively, which were above the minimum requirement showing adequate fit and the parsimony fit measure AGFI was 0.972, which also was above the cut-off point. Thus, the model adequately fits with the data.

5.8 MALT Model: Third Version

On the basis of all the analyses which were carried out, the third version of the MALT model was developed, as shown in Figure 16. MALT stands for motivation and acceptance of learning with tablets. It is based on the original technology acceptance model (TAM) and self-determination theory (SDT). The dependent variable in the MALT model is behavioural intention. Moreover, there are two mediation variables of perceived enjoyment (which stands for intrinsic motivation) and perceived value (which stands for extrinsic motivation). There are two other independent variables of perceived enablers and perceived image. The moderator variables in this model are access and teacher support. In this model, perceived image has indirect influence on behavioural intention. Perceived enablers, enjoyment and value have significant direct influence on behavioural intention. In Figure 16 the dashed lines show the moderation effect on the model and the original lines show the relationships between the latent factors in the model. The standardized regression weight and the significance levels are listed. The variables' codes and definitions are in Table 19. The refinement questionnaire (instrument) which belongs to this model is attached in Appendix D.4.

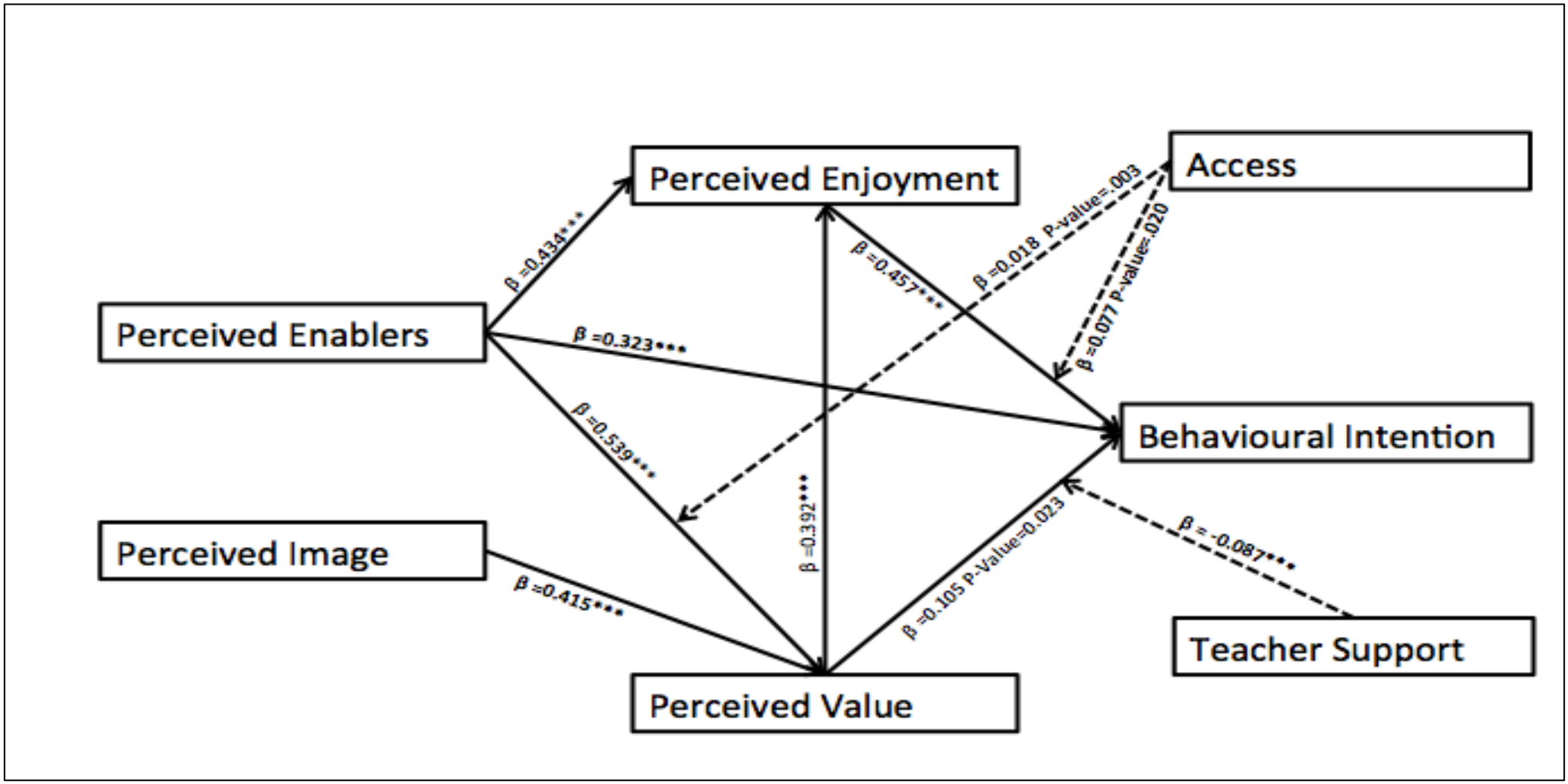

Figure 16 Third Version of the MALT model

Table 19 Definitions of the third version of the MALT model Variables

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

5.9 Qualitative Open-ended Questionnaire Result

There are two types of questionnaire participants, those who do and those who do not use a tablet for learning. The results of the open-ended questionnaire will identify the factors which deter students from using tablets for learning and the preferred ways of using tablets for learning. The analysis was done deductively to ascertain the reasons and preferred ways of using tablets for learning, but also inductively to derive the subthemes.

In presenting the findings below, alphabetical and numeral codes are used instead of participants. Each participant in the study was given a code. The first letter (S) refers to the student. The second letter (Q) represents the method used in collecting the data. The third number represents the participant's ID when answering the questionnaire (1 to 364). Thus Interviewee SQ.40 refers to student number 40, who responded to the questionnaire. Note: the descriptions, 'a few', 'some', 'many' and 'most' are used in a regular manner to give the number of respondents. Each indicates a specific range of participants. The descriptions and evidence from the research findings on the two themes are given below.

5.9.1 Reasons Deterring Students From Using A Tablet For Learning

Out of 490 participants, 40 (11%) answered negatively to the third question, which was "Do you use any kind of mobile technology device for learning?". They were then moved on to the three qualitative questions which were,

- "Why do you not use a mobile device for learning? (difficult, boring, expensive, etc.),
- Do you have a positive attitude to using a tablet for learning? If yes, why? If not, why not?"
- "Do you intend to use a tablet for learning? If yes, how? If not, why not?".

Note: the descriptions, *a few* indicates less than 10 participants; *some*, 11 to 19 participants; *many*, 20 to 29 participants; *most*, 30 or more participants; and *all* means 40 (i.e. the total number of participants). Thematic analysis was conducted to find the reasons why students are deterred from using tablet devices, and this resulted in six themes. These are sight worries, limited resources, boredom and distraction, mobile device characteristics, discipline, and personal preference.

The first theme is sight worries. Students are concerned about their eye health when using mobile devices in learning. They mentioned that mobile devices "damage my eyes" (SQ.1), "have a bad effect on eyes" (SQ.37), "make me lose my sight" (SQ.40), "if I use it in learning, it will damage my eyes" (SQ.16), "from my point of view, it has the disadvantage of eye damage" (SQ.29), "if you use

it for hours, it will hurt your eyes" (SQ.33).

The second theme is limited resources. This includes university and teacher support, necessary skill and smart applications. For example, SQ.28 stated that "the university prohibits tablet use inside the classrooms". Another wrote, "university does not allow us to use tablets but I hope they will in the future" (SQ.3). SQ.4 mentioned that "my teacher does not ask us to use mobile devices in our learning". A few mentioned that they could not find the resources available on the tablet which they needed to use for learning, for example, "I can't find the resources and books on my tablet" (SQ.30) and "I can't find useful apps on the tablet which let me use it instead of a laptop" (SQ.31). Moreover, SQ.26 stated, "I do not have enough skill to use mobile devices in learning".

The third theme is boredom and distraction. Most of the respondents believe that mobile devices can distract them from learning and some feel that mobile devices are boring when using them for learning. This was expressed in the following ways: "to conclude, using a tablet is boring" (SQ.1), "it makes me completely bored" (SQ.7), "it's boring" (SQ.9,13,21,36), "I don't like using mobile devices because they make learning boring" (SQ.7). According to students' perspectives, mobile devices can also cause distraction. For example, "tablets have apps that can distract you" (SQ.2), "it distracts my mind" (SQ.15), "it can distract me as it connects to social networks and YouTube" (SQ.22), "although it is useful, it may distract me from learning" (SQ.18). One students viewed tablets as boring and distracting at the same time and stated that mobile devices are "boring and do not help me to concentrate" (SQ.38).

The fourth theme is mobile device characteristics, including cost, use, battery life and speed. For instance, a few believe mobile devices are difficult to use, such as, "its use is a little bit difficult" (SQ.1) and "it is difficult" (SQ.5). Some mentioned mobile device speed, battery life, drawbacks and technical problems. For instance, "it is slow" (SQ.3),"it has a short battery life" (SQ.24), "it has a lot of drawbacks, such as battery life" (SQ.15), and "it may have some technical problems" (SQ.23).

The fifth theme is discipline. Some students stated that their discipline does not require them to use any kind of mobile devices in learning. For example, "my subjects do not need me to use mobile devices in learning" (SQ.8), "I am still in foundation year and don't need to use mobile devices, as I don't have any projects to do" (SQ.17), "we don't need to use mobile devices in our faculty" (SQ.19), "my discipline doesn't require me to use mobile devices" (SQ.34). All of these students were found to be studying social sciences.

The sixth theme is personal preference. Deciding whether to use mobile devices for learning or not can simply be a matter of preferences. For example, "I don't have to use a tablet" (SQ.12), "I don't need a tablet, the smartphone is enough for me" (SQ.14), " I prefer to use a laptop rather than a

tablet" (SQ.18), "I prefer to write by pen while I learn" (SQ.26), "I don't think I need mobile devices as traditional books are enough" (SQ.27), "I prefer to read using printed books" (SQ.7), "I can't focus on learning unless I write using pen and paper" (SQ.32), "I prefer using paper as it's easier for me" (SQ.1), "I can't get used to a tablet" (SQ.11), "I prefer to be independent from technological devices in learning" (SQ.23), "I prefer to not use technological devices in learning as I can't trust what is in there as I believe it's distorted" (SQ.31), "I don't like using mobile devices in learning" (SQ.38).

5.9.2 The Preferred Ways Of Using Tablets For Learning

Out of 490 participants, 364 answered all of the items on the questionnaire. All had the option to answer the two open-ended questions. One of these questions asked about how they use the tablet or intend to use it.

Note: *a few* indicates less than 49 participants; *some*, 50 to 99 participants; *many*, 100 to 199 participants; *most*, 200 or more participants; and *all* means 364 (i.e. the total number of participants). The preferred ways are categorised into five sub-themes: students prefer to use tablets in learning to accomplish their academic tasks, for communication and online discussion, in a way that support their learning styles, as an aid learning tool and for searching and learning online through online platforms.

First, students prefer to use tablets for learning **to accomplish their academic tasks.** Most of the participants stated that they use tablets or intend to use them "to do assignments and short quizzes" (SQ.62, 123, 325), or to "study with it before exam time" (SQ.112,118). Moreover, most of them indicated that they intend to use tablets to download materials and slides of the lectures in order to study from these instead of printing them as hardcopies: "I download slides and write notes on them" (SQ. 42), "I download all the materials and curriculum on my tablet" (SQ.121, 307), "I download slides instead of printing them and wasting money and paper" (SQ. 230), and this enables them to study anywhere at any time they want to: "I intend to use a tablet to study from it anywhere anytime I want to" (SQ.110, 169). A few mentioned that they use a tablet for reading materials or books. For example, "I use it for reading" (SQ.128) "reading books and articles" (SQ.168), "I download electronic books" (SQ.70, 115, 179) and "instead of buying traditional books that cost more" (SQ.166).

Second, participants stated that they **intend to use tablets for learning for communication and online discussion purposes**. Most highlighted that they intend to use tablets for learning discussions with their teachers or friends, or to share useful information with friends. For instance, "to communicate with teachers" (SQ.58),"share knowledge with others" (SQ.70), "share any useful information with my friends" (SQ.118), "discuss points I do not understand" (SQ.120), "discuss with

my friends about the course" (SQ. 251). They can also submit their assignments via Blackboard or send emails to their teachers; "send my assignment to my teacher via emails" (SQ.143, 146).

Third, it was noted that participants **use tablets in ways that support their learning styles.** Some said they use tablets for learning by watching useful videos related to their course: "if I don't understand the lectures I can use YouTube on my tablet to watch more videos on the same topic" (SQ.130), "downloading images" (SQ.220), and "watching videos and viewing images are helpful for memorisation" (SQ. 312). Some stated that using a tablet for learning enables them to watch and listen to media materials as they love to study this way. For example, SQ.75 wrote that "I would use a tablet to study using media to understand more easily" and SQ.109 wrote, "I watch a lot of learning videos related to my course".

Fourth, participants identified that they would use tablets as **a learning aid tool**. Many stated that they use it for taking notes or recording lectures. It is noted that the students actually intend to use tablets inside the classrooms in many ways such as "writing notes and recording lectures" (SQ.44), "taking notes" (SQ.172), "use the calculator to answer the mathematical questions" (SQ.46) and "record my notes and save references to easily use it later" (SQ.68). Most of them use it or would use it "to access Blackboard" (SQ.215). Some of them mentioned they use it or intend to use it for translations either inside or outside the classroom such as "use it in translation" (SQ.50, 156) and "translate immediately if I don't know a word that my teacher uses inside the classroom" (SQ.69). A few intend to use tablets only for organising their courses timetable or to knowing their lecture times. For instance, "I use it to organise my course timetable and to know my schedule" (SQ.184), "I use it to save all my important materials" (SQ.129) and "to check my timetable" (SQ. 270). Some would use it for useful mobile applications inside or outside the classrooms: "I use helpful mobile applications so that I can understand more" (SQ.82). A few mentioned that they intend to use it for graphic designing. For example, SQ.128 and 201 stated that they "would use it for graphic design".

Fifth, participants classified that they would us**e tablets for searching and learning online through online platforms.** Most of them said they use a tablet to search for useful information related to their study field. For example, "I intend to use it when searching for any useful new information" (SQ.155) and to "search Google for anything I want to know about" (SQ.197). Many mentioned they would use it to attend courses through massive open online course (MOOC) websites or as distance courses: "I use it to search about information related to my study field" (SQ.65, 67), "look for electronic books and useful resources" (SQ.84), "attend virtual classes" (SQ.78, 208), "I study different courses in distance learning, so I use it for this purpose" (SQ.52), "I study courses available on educational websites or on international universities websites" (SQ.135), "for access to websites that explain modules/curriculum" (SQ.170) and to "make use of the academic websites" (SQ.190).

The statistical result of those students' attitude and intention towards using tablet for learning are given in Appendix F.

5.10 Summary

This chapter presents the results of the questionnaire in the form of exploratory factor analysis, confirmatory factor analysis and structural equation modelling to indicate verification of the model. The third version of the MALT model has been explained, and the results of the open-ended questionnaire have been presented.

In the factor analysis and structural equation modelling (SEM) of the questionnaire results, the model was altered to include five factors with only two moderators. The dependent variable in the MALT model is behavioural intention. Two mediation variables are included, which are perceived enjoyment (standing for intrinsic motivation) and perceived value (standing for extrinsic motivation). There are two additional independent variables, which are perceived enablers and perceived image. The moderating variables in this model are access and teacher support.

From the SEM analysis of the students' questionnaires, it is clear that perceived image and perceived enablers significantly influence perceived value; perceived enablers and perceived value significantly influence perceived enjoyment; and perceived enablers, perceived value and perceived enjoyment significantly influence behavioural intention. The statistical results demonstrate that the MALT model provides a good fit to the data.

Based on the results of the student questionnaires, the barriers are as follows: sight worries, limited resources and support, boredom and distraction, mobile device characteristics, discipline, and personal preference and knowledge. Based on the results of student questionnaires, we can see that students use their tablets for learning both inside and outside the classrooms. They use their tablets mainly to accomplish academic tasks, to communicate with each other and take part in online discussions, and to search for information online. Students prefer to use the tablet as a learning tool in ways that support their own individual learning styles.

The next chapter presents reflections on the model based on the results of the interviews with the TAM experts.

Chapter 6: Phase Three: Reflections on the Model

This chapter presents experts' reflections on the MALT model. The method, sample and procedures used in this phase are described, after which the interviews are analysed and explained.

6.1 The Method, Sample and Procedure

The method used in this phase was the semi-structured interview. The interview schedule (in English) is in Appendix C.3. I first translated the interview schedule and then it was verified by an English teacher who speaks Arabic as a first language. The Arabic version is in appendix C.4. The sample for this phase consisted of three experts in the technology acceptance field who have used this theory in Kingdom of Saudi Arabia KSA-based research. They specialise in computer science and were chosen via purposive sampling. The third version of MALT was sent to the three researchers the night before the interview, along with the definitions of the constructs. Before the interview, they were asked if they needed more explanation of the model.

6.2 Interview Analysis

Thematic deductive and inductive analyses were used in this phase. Thematic deductive analysis uses themes that are known before the analysis takes place. Those themes are based on the theoretical model and the research questions. Thematic inductive analysis means that the themes emerged from the results. More details on this are included in Chapter 4. Four of the themes are deductive, which means that the researcher is looking for them in the results (constructs association, moderation effect, model integration, and overall model evaluation), and one of the themes is inductive, as it emerged from the interview results (suggested changes).

6.3 Interview Results

This section is an analytical narrative illustrating this data from the third phase, i.e. the expert reflections on the MALT model. The process of data analysis attempts to answer the research question, and to meet the investigation aim of bringing a better understanding of female undergraduate students' attitude and use of the tablet as a mobile learning tool. Three interviews were conducted in this phase (N=3) and their analysis discusses four themes, as the mind map shows in Figure 17.

The data yielded five themes as shown below: constructs association, moderation effect, suggested changes, model integration, and overall model evaluation.

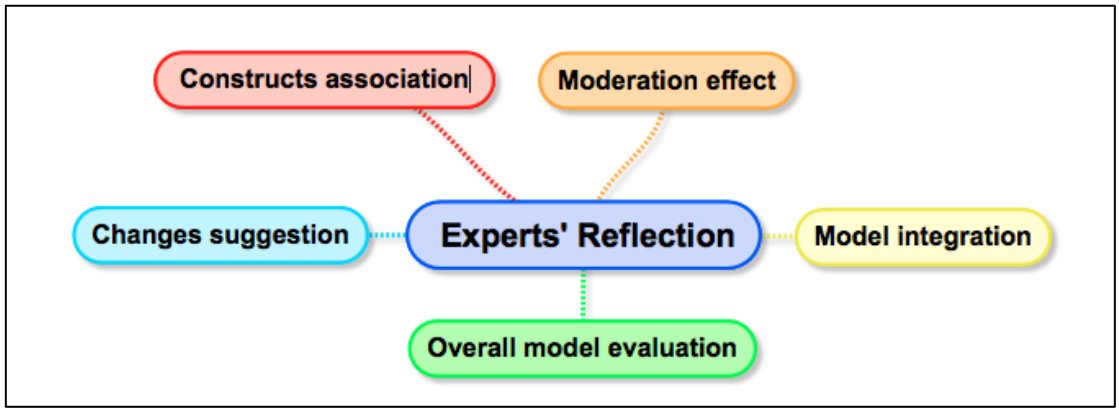

Figure 17 Themes of experts' interviews

In presenting the findings below, alphabetical and numeral codes are used instead of interviewees' names to preserve anonymity. Each participant in the study has a code. Following the same convention as the previous naming of respondents, the first letter (E) refers to the expert and the second letter (I) represents the method used in collecting the data which is the interview. The number represents the participant's individually assigned number (1 to 3). Thus, Interviewee EI.3 refers to expert number 3, who was interviewed. Note: the construct codes are as follows: perceived enablers (PEN), perceived enjoyment (PEJ), perceived image (PIM), perceived value (PV), behavioural intention (BI), access (ACC), and teacher support (TS). The MALT model: version 3 is detailed in Chapter 5. The descriptions and evidence from the research findings on the five themes are given below.

6.3.1 First Theme: Construct Association

Construct association refers to the relationships between the latent factors in the MALT model. Regarding the relationship between PEN and PEJ, all agreed that this association is linked, for instance, EI.1 said "it is logical, since if it is easy to use and if using tablet for learning is efficient, the students will enjoy using it, especially for ease of use. Our students love using easy things — they use things because they are easy more than because they are valuable, this is even true of academic staff in KSA universities". EI.2 added that "from my perspective, I expect it is really that students enjoy the use of tablets for learning if they perceive the enablers, and the enablers are so important because if they are there, students will enjoy more and achieve more by using tablets for learning".

Regarding the relationship between PEN and PV, two experts commented that there is a relationship between the two, for example, EI.2 stated, "I can explain the relationship like this: if the enablers are there, students can achieve more, and write the assignments faster". However, one of the experts did not agree that all items in the PEN link with the PV. EI.1 said "the ease of use and efficacy will influence students' achievement but not mobility, mobility is not relevant".

For the relationship between PEN and BI, all agreed there is a relationship between the two; for example, EI.2 said “the students’ intention to use tablets for learning depends on the perceived enablers, and especially ease of use, which really influences the intention to use”. EI.3 commented on all the relationships in which PEN influences other factors by saying, “the three relationships between PEN and PV, PEJ and BI make sense and are logical”.

For the relationship between the PIM and PV, all agreed that there is a relationship between the two and were happy that image is in the model. EI.1 said, for example, “there could be a relation”; EI.2 said, “definitely, there is a relation between the two as I see one of the values of using a tablet is that it gives them a good [self] image”. EI.3 said, “if students have a high sense of image enhancement, it will increase the value of using a tablet and so this also makes sense”. She commented on the PIM factor as being, “very influential and significant in Saudi Arabia culture…If you look at the cultural framework, you can see that SA is a collectivist society in which perceived image is really important and significant, and it influences users to use any technology”. However, she expected a direct relationship between the PIM and BI and said, “so the effect of PIM is mediated by PV on BI. Because it is a kind of value. May be this is the explanation, that image is a kind of value or a goal, which makes sense. There is no one way of modelling something”.

Regarding the relationship between the PV and PEJ, all agreed that there is a relationship between the two. For example, EI.1 said “correct, because if the students perceive the value and achievement of using a tablet, they will enjoy using it…I think it depends on achievement, if there is achievement, they will enjoy using a tablet for sure”. EI.2 said, “people have emotions, so it is necessary to feel enjoyment, and when students realise the value of tablet use for learning, they will definitely enjoy it”. EI.3 said “the more students think they can achieve using a tablet, this will influence their enjoyment, it makes sense…Value is extrinsic and enjoyment is intrinsic, I think they influence each other... Because of course if they feel they achieve something with it, they will be happy and enjoy using it…It is a valid relationship from my point of view”.

For the relationship between the PV and BI, EI.1 commented, “for sure there is a direct relationship and this is correct”. EI.2 assumed “if students perceive that they gain more academic achievement and higher grades when using a tablet, this will influence their intention to use”.

In terms of the relationship between the PEJ and BI, all highlighted the importance of the relationship between the two, for example, EI.1 said “yes, there is a direct relationship between them”. EI.2 said “of course there is a relationship between the two, as if students perceive the enjoyment of using a tablet for learning, they will definitely intend to use one — what do we like more than enjoyment?”. Moreover, EI.3 commented on the factors that influence BI by stating “BI is influenced by PEJ, PEN and PV, so it is perfectly valid for me”.

6.3.2 Second Theme: Moderation Effect

The theme of moderating effect refers to the effect of the moderators on the relationships between the latent factors in the MALT model. All experts noted that access is a moderator in the MALT model, for instance, EI.1 said “for sure, it has moderating effect on all the relationships in the model”. However, she commented on how access moderates the relationship of PEN and PV, saying, “there is moderation between them but I do not expect it will be significant”, whereas EI.2 said “the moderator here is logical and I feel that access is a prerequisite”. In terms of access moderating the relationship between PEJ and BI, EI.1 said “yes, there is a moderating effect”, EI.2 said “access strongly moderates the relationship between PEJ and BI”, and EI.3 agreed also that “access is a moderator and strengthens the relationships in the MALT”.

It is assumed that teacher support moderates the relationship between PV and BI by dampening it. However, EI.1 said, “I do not expect that teacher support dampens the relationship between them. I expect the opposite, that it strengthens the relationship”. She continued by saying, “you know that in our universities if a teacher asks you to do something, you have to do it, even if you do not want to. So even if students do not perceive tablets as a valuable learning tool, if the teacher asks them to use it, they have to”. Moreover, EI.2 assumed and explained the moderation effect by saying “I think it strengthens the relationship between the two, but it could be like this in the way they reach a stage where they are considered as self-learning and also that students are in a generation which is different from their teachers, so they think they are better than them at using tablets for learning and don’t need teacher support...the university must decide whether teachers are expert in using tablets or not”. On the other hand, EI.3 had another explanation as to why TS dampens the relationship between PV and BI. “It means that the more the teachers support students to use it, the less they want to…I think this confirms the fact that using a tablet is better done on a voluntary basis. It is not a mandatory use, as it is a personal device, if students like it, they use it, if they do not like it, they should not be forced to use it. It is different to desktop computers in the lab, where they are forced to use them., and tablets are another option for getting the content from interaction. So TS does not really matter if students intend to use a tablet when they have perceived the value of tablet use for learning…I think it makes sense as it can be explained”.

6.3.3 Third Theme: Suggested Changes

All of the experts suggested changes to the MALT model to better suit the study context according to their perspectives. For example, EI.1 said “I expected all the independent factors to refer to the BI”. She meant that PIM is the only one not related directly to BI, and said “I expect that there is supposed to be an association between PIM and BI, as PIM can directly influence BI, especially for Saudi students. They really care about their image, so I feel there is a relationship between them”.

In addition, EI.3 suggested the same, “I would expect a direct relationship between PIM and BI”. On the other hand, EI.2 suggested a “relationship between the PEN and PIM” and explained this as “if the student perceives the enablers, she can guarantee her image” and also “to study access as an independent factor”. EI.3 commented that “I would not suggest a change. The fact that I would expect a link or a direct relationship between PIM and BI is something I think it should be there, but it is mediated by PV, I think it makes perfect sense, the way as it looks now...I do not think I would change anything in this model”. However, she suggested a change in construct name, “I would rather change the term PEN to perceived usability, as in computer science, usability in human computer interaction means the same as enablers in your model”.

6.3.4 Fourth Theme: Model Integration

The theme of model integration refers to the integrated motivation theory of self-determination theory (SDT) and the original technology acceptance model (TAM) being the MALT model. When asked about the integration, the TAM experts seemed to approve of this. For example, EI.1 commented that “the MALT model considers the important factors from both fields of technology acceptance and motivation, and sees that image is so important in Saudi Arabian context…and it is true that PV is operationalised by extrinsic motivation and PEJ is operationalised by intrinsic motivation”. Moreover, EI.2 said “I believe that adding motivation factors is a strong enhancement to the TAM as the original TAM concentrates on the extrinsic. Adding motivation to the TAM means that you study three groups of users, those who only care about intrinsic motivation, those who only care about extrinsic and those who care about both of them…motivation is important as it studies the human emotions and feelings”. Furthermore, EI.3 said that “TAM is very flexible, it is a base or skeleton for technology acceptance, it can include other things, and so when you add motivation to it, it makes perfect sense”.

6.3.5 Fifth Theme: Overall Model Evaluation

The theme of overall model evaluation refers to the evaluation of the MALT model as a whole from experts’ perspectives or points of view. All the experts agreed that the MALT model is a logical model that suits the study context. For example, EI.3 said, “BI is an important factor in your context and any factor should influence it in either a direct or indirect way”. EI.1 evaluated the model from her point of view by stating that “the whole model looks absolutely sound in predicting the students’ intention to use tablet for learning, though I do not expect that the attitude is not there, it is an important factor, however, I love the fact that you have your own model at the end, this is a contribution of your study, you changed the constructs’ names as Venkatesh did”.

Moreover, EI.2 commented that “it expressed many points of views. All the factors are important...I love the way you have collected more than one construct and that make sense…the model explains students’ acceptance and motivation to use tablets for learning in KSA”. Additionally, EI.3 reflected on the model by saying that “I think it really makes sense, the fact that it builds from the students themselves, it really shows what matters and how things are related to each other, I like the connection between the achievement and usefulness being called perceived value (as extrinsic motivation)…what you did is really modelled on the students’ acceptance and motivation to use tablets for learning in HE, I do not think there is something missing significantly…it looks fine”.

6.4 Summary

This chapter has discussed the MALT model based on experts’ evaluations and reflections. It presents the experts’ interview responses, in which they express satisfaction with the model in general, although a few alterations were suggested. This activity concludes the third phase of data collection and analysis as well as the process of exploratory sequential methods. The next chapter discusses the findings from all three data collection phases in order to answer the research questions.

Chapter 7: Discussion

This chapter discusses the findings of all three phases, with respect to answering the research questions.

7.1 **Main Questions***: What are the factors that influence* **female undergraduate** *students' motivation and acceptance of the use of tablet computers for learning and how significant are the interrelationships between them?*

The main research question can be answered based on results of the two methods used: interview and questionnaire with the higher education (HE) students, and interview with the technology acceptance model (TAM) experts. The three phases were carried out in sequence, in order to answer the main research questions. The data obtained from the two methods had different implications for the model. Based on the thematic analysis of student interview results, eleven factors (constructs) were identified in the motivation and acceptance of learning with tablet (MALT) model (see section 4.4.2). The first is actual performance, which is the dependent variable, followed by two other variables: attitude toward tablet use and intention to use a tablet. The model then features eight further factors relating to perception; the first three are self-efficacy, enjoyment and willingness (considered as intrinsic motivation), and the second five are usefulness, ease of use, identity, mobility and achievement (considered as extrinsic motivation). As well, eight moderating variables were identified: experience, skill, access, knowledge, discipline, university support, teacher support and tablet characteristics. In carrying out factor analysis and structural equation modelling (SEM) of the student questionnaire results, the model was changed to include five factors with only two moderators (see section 5.8). The dependent variable in the MALT model is behavioural intention. Then there are two mediation variables of perceived enjoyment (standing for intrinsic motivation) and perceived value (standing for extrinsic motivation), followed by two other independent variables of perceived enablers and perceived image. The moderating variables in this model are access and teacher support. The last phase of expert reflection showed that all five factors are important and match the study context. Details about factors (constructs) which are used in the development of the MALT model can be found in appendix G Table 31.

Perceived enablers combine three constructs, namely ease of use, self-efficacy and mobility. My study is in agreement with a study by Aziz (2015), who found that perceived mobility was one of the key factors that influenced students' intentions to continue using smart devices in their learning

at Stockholm University, although mobility in this study is combined with other constructs and does not stand alone as a main factor. Moreover, Martin et al. (2013) studied students' motivation to adopt m-learning and reported that mobility was the main motivator. This study is also consistent with that of Cheung and Lee (2011), in that computer self-efficacy is an important indicator of perceived ease of use, and is also in line with research by Compeau and Higgins (1995), showing that self-efficacy plays an important role in determining technology usage. This study also agrees with Venkatesh and Bala (2008), who found that self-efficacy was a factor in the model they developed (TAM3). On the other hand, they examined the effects of self-efficacy only on perceived ease of use (Venkatesh & Bala, 2008), and did not assess its role within the full nomological net of TAM (Yi & Hwang, 2003). In the current study, self-efficacy has been combined with mobility and ease of use being perceived enablers, and perceived enablers has been examined with all other factors in the MALT model. Furthermore, several technology acceptance models have used the factor of perceived ease of use and found that it is important in predicting and explaining technology acceptance by users (Davis et al., 1989; Mathieson et al., 2001; Venkatesh & Bala, 2008; Venkatesh & Davis, 2000; Venkatesh et al., 2003). This study used the factor ease of use, but in combination with mobility and self-efficacy in perceived enablers.

Perceived value is a factor in the MALT model which combines achievement and usefulness. This is in agreement with findings that students perceived m-learning to be effective both in informal learning and for communication purposes (Al-fahad, 2009; El-hussein & Cronje, 2010; Al-Husain and Hammo, 2015). It is also consistent with the findings of Hocann and Iscioglu (2014), that students feel that using tablets has the effect of enriching their lessons.

Perceived enjoyment is an important factor in the MALT model, as in previous TAM models, the motivational model (MM) and TAM3 (Davis et al., 1992; Venkatesh & Bala, 2008). Both Davis et al. (1992), who developed the motivational model, Schaik (2011), and Bertrand and Bouchard (2008) have treated perceived enjoyment as an indicator of intrinsic motivation, as for the current MALT model. The enjoyment factor is used to represent intrinsic motivation when exploring how intrinsic motivators affect an individual's technology acceptance behaviour (Leng et al., 2011).

Perceived image is another factor in the MALT model which, according to the expert reflection in the third phase, is an important factor in the study context. Venkatesh and Davis (2000) added two more determinants to the original TAM when they developed TAM2: social influences and cognitive instrumental processes. The social influences include subjective norms and image. This study used image as a factor in the MALT model.

Behavioural intention is a dependent factor in the MALT model. Studies have supported the notion that behavioural intention has a positive influence on actual behaviour (AbdulRahman et al., 2011; Davis etal.,1989; Fishbein & Ajzen, 1975; Khechine et al., 2014; Leng et al., 2011). In all technology acceptance models and theories, behavioural intention is a factor.

Three of the factors which were present in the findings of the first phase disappeared in the second phase after factor analysis and SEM. These were actual usage, attitude, and willingness. For actual usage, the expert review of the model constructs (before finalising the main questionnaire) suggested that actual tablet usage need not be considered in the model, as tablets are not yet a part of the study context, and so the model should not take this factor into account. One question is in fact included related to actual usage, but as this did not fit during confirmatory factor analysis and SEM analysis, it was removed. It is noted that several researchers did not include actual behaviour when using one of the TAM models. Moreover, none of the TAM models consider perceived willingness as a factor. A personal explanation is that technology acceptance models refer to user willingness as a whole. In the factor analysis, willingness seemed to be a problematic during the exploratory factor analysis and so it was removed. In the TRA and TAM models, attitude is a determinant of behavioural intention. However, in TAM2, the variable of attitude was removed (Wu et al., 2011). In the study by Shroff et al., no statistically significant relationship was found between perceived usefulness, attitude towards usage and behavioural intention to use the e-portfolio system (Shroff et al., 2011). Teo and Schalk (2009) also found that attitude towards using computers did not have a significant effect on the intention to use, and, as stated, some technology acceptance models such as TAM2 and UTAUT omit the factor of attitude. Venkatesh and colleagues justify the removal of attitude in TAM2 by arguing that it plays a limited role in determining behavioural intention or actual usage (Venkatesh & Bala, 2008; Venkatesh et al., 2003). This study is agreement with all of the foregoing research in this regard. Based on the statistical analysis in the second phase, attitude items were positively skewed and so attitude was removed.

The second part of the main question asks about the relationship between the factors that influence students' motivation and acceptance when learning with a tablet. This has been answered based on the student questionnaire responses and expert reflection interviews. The SEM analysis of the student questionnaire indicates that perceived image and perceived enablers significantly influence perceived value; perceived enablers and perceived value significantly influence perceived enjoyment; and that perceived enablers, perceived value and perceived enjoyment significantly influence behavioural intention. Thematic analysis of the TAM expert reflections revealed that all of the construct associations in the MALT model were considered valid and logical, although there were suggestions that perceived image would directly influence behavioural intention.

Teo et al. (1999) reported that extrinsic motivation is generally stronger than intrinsic motivation. However, this study found the opposite, as intrinsic motivation (perceived enjoyment) was found to be stronger than extrinsic motivation (perceived value) in predicting the behavioural intention of tablet use for learning. A study by Courtois et al., cited in Schnackenburg (2013), showed that secondary level students use tablets in classrooms because they perceive them to be a useful and enjoyable tool, and not because of peer pressure. The current study is in agreement on this point, since perceived value and enjoyment of using a tablet for learning was found to influence behavioural intention. However, perceived image does not appear to influence behavioural intention directly. The results of this study revealed that three factors of perceived value, perceived enjoyment and perceived enablers have a significant positive influence on students' mobile learning acceptance, and this matches the results of Mtebe and Raisamo (2014) and Wang et al. (2009), who concluded that performance expectancy, effort expectancy, social influence, and perceived playfulness were significant factors of behavioural intention to accept m-learning.

Many researchers suggest that those students who use mobile devices for learning purposes are motivated and engaged in learning and accordingly raise their achievement levels (Aziz, 2015; Rogers et al., 2010; Wang et al., 2009). In the MALT model, both factors of achievement and usefulness are combined in perceived value. This study is in agreement with the majority of TAM models in that perceived value has a direct influence on behavioural intention. In their study, Yoo et al. (2012) discovered that the extrinsic motivation factor of perceived usefulness directly influences the intention to use. Moreover, the TAM suggests that perceived usefulness is the strongest predictor of an individual's intention to use information technology (Davis, 1989; Venkatesh and Davis, 2000; Venkatesh et al., 2003). An interesting finding in this study is that perceived enjoyment is the strongest predictor of students' behavioural intention to use tablets for learning which is in contradiction to most of the TAM models results. The variable of perceived enjoyment is used in this study to represent intrinsic motivation, and it was found to have a positive influence on behavioural intention in the MALT model. This finding is consistent with Schaik (2011), who demonstrated the powerful role of intrinsic motivation in the acceptance of hedonic systems and recommended that intrinsic motivation should be a factor in technology acceptance models.

An unexpected finding is that perceived image has a significant positive influence on perceived value and this agrees with Venkatesh and Bala's TAM3, which claimed that perceived image influences perceived usefulness. Moreover, this study results are in agreement with Garg and Garg (2013) in which perceived image did not have a direct relationship with behavioural intention.

Seifert and O'Keefe (2001) emphasise that students need to feel confident and have a sense of control over their learning in order to become motivated. Moreover, Zimmerman (2000) pointed

out that students' perceptions of self-efficacy in their academic ability play a vital role in their motivation to achieve. The motivational impact of self-efficacy can be dramatic (Bandura, 1986, 1989), as when individuals perceive their self-efficacy to be high, they will engage in tasks (Pintrich & Schunk, 2002). Igbaria and Iivari (1995), on the other hand, discovered that self-efficacy has an insignificant direct effect on perceived usefulness, but a strong indirect effect on perceived ease of use (Lopez & Manson, 1997). The findings of this study show that self-efficacy is combined with ease of use and is included with the perceived enablers, which positively influence perceived value. Compeau and Higgins (1995) showed that self-efficacy plays an important role in determining technology usage, both directly and through outcome expectation. This study is in agreement with this. In conclusion, in social sciences research, the issue of difference in statistical significance is common because of the complexity of human behaviour (Taiwo & Downe, 2013).

7.2 First Sub-Question*: What are the moderating variables that affect the relationships between the variables in the MALT model?*

This research question can be answered using data from the student questionnaires, as well as from the student and the TAM expert interviews. The results of the two methods had different implications for the MALT model.

Based on the first phase of student interviews, there are eight requirements of experience, skills, knowledge, discipline, university support, teacher support, tablet characteristics and access. These have been treated as moderators in the second phase, but are known as requirements in the first phase, which more suits qualitative analysis. In contrast, the factor analysis and SEM of the student questionnaire results indicated that out of the eight requirements, only two moderators (access and teacher support) had moderating effects on the MALT model. In addition, the TAM experts in the third phase agreed on and gave explanations for the moderators of access and teacher support in the MALT model.

The findings from all three phases ascertained that Internet access is a moderator in the MALT model. This is in agreement with several studies (Alsaadat, 2009; Huang et al., 2008; Mehdipour & Zerehkafi, 2013; Mohseni, 2014; Narayanasamy & Mohamed, 2013; Pajo & Wallace, 2001; Paris, 2005; Park, 2009) in which Internet access may influence users to accept to use mobile devices for learning. Moreover, the statistics indicate that access strengthens the relationships of enjoyment and enablers with behavioural intention. A case study in KSA by Alkhalaf (2015) found that m-learning requires good wireless network bandwidth in order for it to work well, and showed that students continue their learning activities outside class time wherever a Wi-Fi network is available. In another study, the majority of students in the sample, who were from a variety of disciplines, felt

that the availability of wireless networks had increased their ability to work independently (Al-Fahad, 2009). Thus, if the use of tablets is combined with wireless classrooms, learning could be enhanced (Paris, 2005).

Bagozzi et al. (2003) and Taylor and Todd (2001) claimed that TAM does not consider the barriers that could prevent individuals from adopting a particular technology, such as the device characteristics and level of support. These can influence the acceptance of a technology, but are not considered in the TAM. This study has included tablet device characteristics as well as university and teacher support. By using SEM analysis, the model does not fit and the moderation effect does not account significantly for the tablet characteristics and university support. Akour and Dwairi (2012) found that organisational support factors are not completely stable determinants of technology acceptance and this is consistent with the finding of this study.

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

On the other hand, personal knowledge and personal skill did not show any significant moderating effects on the relationships in the MALT model. According to students' perspectives in the first phase, knowledge and skill may influence the acceptance of tablet use for learning, however, they have not shown any significant moderating effect on any of the relationships in the MALT model during the SEM analysis. A possible explanation is that in the questionnaire results, more than 200 respondents had strong knowledge and skills in tablet use for learning.

Although discipline is considered as a requirement, it was also perceived as a barrier to accepting tablet use for learning in the first and second qualitative phases of the study, in which students felt that tablet use was only suitable for students who study natural science. Goundar (2011) concluded that tablets were specifically helpful for laboratory work as the students were able to carry them

around. However, in the SEM analysis of this study, it was clear that there was no statistically significant difference between the discipline groups in the MALT model. This result contradicts that of Orji (2010), who found that the variables influencing technology acceptance varied between the three academic disciplines investigated (Art and Science, Engineering, and Social Science). On the other hand, this study findings are in agreement with the study of Pynoo et al. (2011), who showed that there was no real difference between faculties when accepting technology, although their study sample comprised natural science students (engineering and medical health).

Although experience is considered as a requirement of accepting tablet use for learning in the first phase of the study, the SEM analysis revealed no statistically significant difference between the experience groups in the MALT model. This contradicts three of the previous TAM models: TAM2, TAM3, and UTAUT (Venkatesh & Bala, 2008; Venkatesh & Davis, 2000; Venkatesh et al., 2003) in which experience acts as a moderator in all three models. Moreover, experience is a significant moderating variable in technology adoption contexts (Legris et al., 2003). A possible explanation for this statistical result is that the sample size for the two groups of experience are not the same.

7.3 **Second Sub-Question***: What are the barriers to tablet use in higher education according to students' perspectives?*

Based on the results of the student interview and questionnaire, the barriers are as follows: sight worries, limited resources and support, boredom and distraction, mobile device characteristics, discipline, and personal preference and knowledge. Previous studies have shown that using tablets for learning can cause a sense of frustration and be a distraction from learning (Butcher, 2014; Mehdipour & Zerehkafi, 2013; Schnackenberg, 2013). This study would agree, since the data shows that tablets have the capacity to distract students and that this negatively affects tablet use for learning. On the other hand, when comparing tablets to laptops, Mang and Wardley (2012) found that tablets presented much less of a distraction to the students than laptops, and that students who used tablets were less likely than laptop users to engage in off-task activities.

Another of the barriers deterring students from using tablets for learning is tablet characteristics. Although tablets are considered as an advancement in learning technology, there are still a number of challenges to overcome (Mang & Wardley, 2012; Mohseni, 2014). One of the main challenges of using tablets in learning is the security setup, and app administration (Fabian & MacLean, 2014). Moreover, students have observed that tablets suffer from limited battery life and small memory capacity (Mehdipour & Zerehkafi, 2013; Narayanasamy & Mohamed, 2013), as well as having complicated security setup, and app administration (Fabian & MacLean, 2014). In addition, students have expressed concern about how they can store files on a hard drive or a flash when using a

tablet, as most tablets cannot be connected to external drives for transferring and/or saving files (Schnackenberg, 2013). However, tablets with USB ports are now available, or alternatively, cloud technology could be used.

The findings showed that limited resources and university/teacher support can be barriers to tablet use for learning in HE. This is consistent with previous studies which found that when educational institutions offer full support and resources to students using digital technology for learning, the students tend to have a positive view of its success in the classroom (Corbell & Valdes-Corbell, 2007; Demb et al., 2004). Pintrich and Schunk (2002) and Martin et al. (2013) have pointed out that the attitudes of lecturers or teachers towards technological innovations may affect students' perceptions of using technology to support their learning. The findings of this study are contrary to those of a previous study by Park (2009), who suggested that university provision of computer access was not an issue for students when using technology for learning. Here, it was found that students are very much concerned about having good internet access whenever they use tablets for learning with specific regard to university programmes.

One of the barriers to tablet use for learning according to students' perspectives is academic discipline. This agrees with a previous study by Orji (2010). However, Pynoo et al. (2011) found that faculty did not present a barrier as there was no real difference when accepting technology per faculty. Furthermore, concern about eyesight was found to be a barrier to tablet use, which supports the ideas of Hocann and Iscioglu (2014), who recognised that using tablets for learning may cause eyesight problems.

Personal knowledge, skill and experience were also found to be deterrents to tablet use. This agrees with Pajo and Wallace (2001), who identified that university tutors' lack of technological knowledge was a barrier to implementing web-based teaching, and with Black and Lynch (2001), who stated that if students have the essential skills, they will have the ability to use the technology.

As Prensky (2001) states, students have changed radically in the ways they use technology, and so the tools of the traditional educational system may no longer suit them. Additionally, Halverson and Smith (2009) point out that technologies have always held great promise for changing an individual's way of teaching, thinking, and learning. However, based on both the results of interview and questionnaire, it was found that some of the students still preferred not to use tablets for learning and that they favoured traditional classroom learning using textbooks and stationery (Liaw et al., 2010).

7.4 **Third Sub-Question***: What are the students' preferred ways of learning with tablets?*

Based on the results of the student interview and questionnaire, students seem to prefer using tablets for learning both inside and outside the classrooms. They use them to accomplish academic tasks, to communicate in online discussions in a way that supports their learning styles, and as an aid to searching and learning through online platforms.

It was revealed that most students would use a tablet for learning if the university were to provide them, and indeed it was clear that many students already use their own tablets for learning. Additionally, the findings identified that students use tablet applications that are related to their study field in order to find out more information or for other academic purposes. Thus, the findings of this research support the previous results of Fabian and MacLean (2014), which indicated that students use tablets in many different ways. In terms of learning content, students used tablets to read, create and share content; in terms of the range of learning activities, students were able to simulate activities (Fabian & MacLean, 2014).

The findings showed that students are able to consider their own learning styles when using tablets and were found to prefer mobile applications to aid learning, which is in agreement with several different study findings (Kothaneth et al., 2012; Pollara, 2011; Schnackenberg, 2013). Moreover, it seems that students use their tablets in order to engage in supplemental activities and tasks in addition to accessing course materials and information inside the classroom (Hylén, 2015). Furthermore, it has been shown that students use tablets as study tools, for activities such as downloading mobile applications to learn concepts related to coursework (Pollara, 2011). Other research has identified that students use tablets to write or complete their assignments, access information, work with digital video and images, surf the web, make reflective notes, and use instant messaging and email (Clarke & Svanaes, 2014; Martin, 2011; Pollara, 2011). Specifically, the study findings indicate that students use tablets to read available course e-books, as found by Romney (2011), and that tablets can be useful for reading because the screen is large, touch-enabled and rotatable.

The findings indicate that students use many mobile applications to support and enhance their learning such as those for email, web browsing, e-books, multimedia, writing notes, presentation, social media, video conferencing, cloud storage, and much more (Mohseni, 2014). The findings about tablet use for learning in higher education ascertained that tablets support and enhance learning processes (Alsaadat, 2009; Habler et al., 2015; Narayanasamy & Mohamed, 2013). Foti (2014) claimed that there is limited research supporting the use of mobile devices in higher

education. The findings of this study indicate that students use tablets in order to enhance learning inside and outside of the classroom.

The findings of this study are consistent with the study of Bennett et al. (2011), who found that their participants all used computer technology for communication and accessing information, and that they considered ease of use to be an important factor. The students in my study seemed to be very motivated to use tablets for learning, as they provide easy access to information, resources and communication with friends, and this supports previous finding by Martin (2011).

7.5 **Fourth Sub-Question***: Can MALT bring a better understanding of Female students' motivation and acceptance of tablet computers use for learning in the KSA higher education context?*

To answer this research question, data from the student questionnaires and the TAM expert interviews were used. The statistics indicated that the MALT model provides a good fit to the data. The dependent variable in MALT is behavioural intention. Moreover, there are two mediation variables of perceived enjoyment (which represents intrinsic motivation) and perceived value (which represents extrinsic motivation). There are two other independent variables of perceived enablers and perceived image. The moderator variables in this model are access and teacher support. Intrinsic motivation is related to perception of enjoyment and extrinsic motivation is related to perception of value (Davis et al., 1992; Vallerand, 1997) and the MALT model reflects this. On the other hand, although Howard et al. (2010) argued that perceived usefulness is not an example of extrinsic motivation and perceived enjoyment is not an example of intrinsic motivation, other TAM researchers point out that perceived usefulness is an instrumental belief that is similar to extrinsic motivation with regard to the benefits of using a system and that enjoyment is related to intrinsic motivation (Davis et al., 1989; Davis, 1989; Venkatesh & Bala, 2008; Venkatesh et al., 2003; Yi & Hwang, 2003). This study is in agreement with this research. An intrinsically motivated student will be very focused on details and processes while an extrinsically motivated one will focus on achievement (Nukpe, 2012).

Previous research has shown that TAM is flexible and can be modified depending on the purposes of the study (Adwan et al., 2013; Davis et al., 1989; Šumak et al., 2011). This is also the case in this study, since the results show that TAM is very flexible and can be considered as a base or skeleton for technology acceptance. Here, the inclusion of motivation factors is appropriate to the higher education context. Furthermore, TAM has been used successfully by groups of researchers in diverse fields, including knowledge management, e-learning, ICT, mobile learning and in healthcare

settings, and with a variety of technologies (Chau & Hu, 2002; Gao, 2005; Huang et al., 2007; Liang et al., 2003; McKinnon & Igonor, 2008; Park, 2009; Sugar et al., 2004; Teo, 2009).

According to Davis (1989), technology acceptance is a crucial factor in determining the success or failure of a computer system project. The experts' reflection assures this by stating that the MALT model predicts students' acceptance and motivation to use tablets for learning in HE in KSA. The original TAM fundamentally examines technology acceptance from an extrinsic perspective (Cheung & Lee, 2011). However, the MALT model examines behaviour based on extrinsic and intrinsic motivation. Two researchers have argued that the individual's behaviour is based on intrinsic and extrinsic motivation (Davis et al., 1992; Deci, 1975). This study has developed a model similar to that of Davis et al. (1992), who developed the motivational model, but with more latent factors and moderation effects based on literature reviews and students' interview responses. Thus, MALT is based on the psychological aspects of technology acceptance.

The qualitative results showed that the TAM experts were in agreement that the MALT model is logical and suits the study context. They approved of this kind of integration and justified this by stating that MALT includes the most important factors from both the technology acceptance and motivation fields of study. Moreover, it is noted that adding motivation factors is a strong enhancement to the TAM, since motivation is integral to human emotions and feelings. Three groups of users have thus been included in this model, those who only care about intrinsic motivation, those who only care about extrinsic, and those who care about both of them. SDT in its initial stages appeared to have limited potential for classroom application, as it focused only on intrinsic motivation. However, extrinsic motivation was later added (Brophy, 2010), since individuals recognise the learning value, even though they may not find the process of learning enjoyable in itself. On the other hand, Pintrich and Schunk (2002) argued that there is no relation between intrinsic and extrinsic motivation. In contrast, a remarkable result found in this study is that there is a relationship between intrinsic and extrinsic motivation and that extrinsic has a significant influence on intrinsic motivation.

The findings of this study are consistent with several others in which intrinsic and extrinsic motivation predict human behaviour. Brophy (2010), for example, found that intrinsic motivational strategies apply when students value the activity itself; and Lepper (2005) found that studying for an exam is not generally considered as an interesting task, but students do it because passing the exam is an important personal goal. In general, it is recognised that technology is adopted because it is enjoyable to use and because benefits are gained from its use (Teo et al., 1999). It has been asserted that intrinsic and extrinsic motivation has a strong relationship with internet use (Ramayah et al., 2003). This study is in agreement with several others which have found that both extrinsic

and intrinsic factors significantly influence behavioural intentions to use an innovation technology (Davis et al., 1992; Igbaria & Iivari, 1995; Ma & Yuen, 2011; Ramayah et al., 2003; Teo et al., 1999; Venkatesh, 2000). In SDT, users want to perform an activity because a 'value outcome' is associated with it (Deci & Ryan, 1985). This is in line with the current study, which found that students perceived the value of using tablets for learning and this predicted their intention to use it for learning. Abu-Al-Aish and Love (2013) argued that students' perceptions of m-learning need to be explored and examined before implementing m-learning in higher education. This study has examined the students' intrinsic and extrinsic perceptions of tablets use for learning in HE.

7.6 Summary

In summary, the factors that influence students' acceptance and motivation to use tablets for learning are perceived image, perceived enablers, perceived enjoyment (stands for intrinsic motivation), perceived value (stands for extrinsic motivation) and behavioural intention. Perceived image has significant influence on perceived value. Perceived value has significant influence on perceived enjoyment and behavioural intention. Perceived enablers have significant influence on perceived value, perceived enjoyment and behavioural intention. Perceived enjoyment has significant influence on behavioural intention. The dependent variable is behavioural intention in the MALT model. The moderators in the MALT model are access and teacher support.

The barriers that deter students from using tablets for learning are sight worries, limited resources and support, boredom and distraction, mobile device characteristics, discipline, experience, knowledge and personal preference. The preferred ways students use tablets for learning are to accomplish their academic tasks, for communication, and for online discussion. They use the tablet as a learning tool as well as to search online for information both inside and outside the classroom, and in ways that support their individual learning styles.

Based on the research findings of this study, it is suggested that the MALT model can be used to better understand students' motivation and acceptance of tablets use for learning in higher education. The integration of the technology acceptance model (TAM) with self-determination theory (SDT) has worked well in the study context. This chapter has discussed the study findings in the light of the existing literature, in order to better answer the research questions. The next chapter concludes the study, outlines the contribution of this study and drawing recommendations, as well as identifying limitations and suggesting future research.

Chapter 8: Conclusion

The first section of this chapter draws conclusions from the key findings of the study, and this is followed by recommendations for educational policy makers. Next, the contributions of this research are outlined, and lastly the study limitations are explained, along with suggestions for future research.

8.1 Concluding Remarks

Information and communication technologies (ICT) have created radical changes in human society. During the 21st century, ICT has seen the rapid and unprecedented development of a variety of mobile devices. The development and widespread use of mobile technology has led to its integration to varying degrees into education system, resulting in the concept of mobile learning (m-learning). M-learning is defined as personalised learning with wireless technology handheld devices at the learner's own pace, which can be done anywhere, at any time and on any subject, and with a degree of privacy. It is claimed that m-learning may be one of the most effective methods of delivering higher education materials in the future. One of the most popular mobile devices is the tablet computer, whose key features for m-learning are one-to-one interaction, place and time independence, capability for personalisation, and extended reach. These features have the potential to attract more and more learners. Although using tablets in learning can enhance interaction and collaboration between students, it could lead to more isolation and distraction. Therefore, there is a need to determine factors that influence learners' acceptance of tablets as mobile learning tools in HE in order to facilitate its adoption and use.

This study has explored the factors influencing higher education students' motivation and acceptance of tablet use for learning via the MALT model (motivation and acceptance of learning with tablet). The study was based on three phases in order to develop, verify and reflect on the proposed model. The first phase was an interview conducted with 20 students which was then analysed thematically in order to explore the factors that influence students' motivation and acceptance of tablet use for learning. Then, in the second phase, the instrument was designed as an online questionnaire and total of 490 students responded. The data was analysed using exploratory and confirmatory factor analysis, as well as structural equation modelling to test the model fit. In the third phase, three experts in TAM were asked to reflect on the model and the data from their interviews was analysed thematically to extract an evaluation of the model. The phases were carried out sequentially in this order.

The findings show that the factors influencing tablet use are perceived image, perceived enablers, perceived enjoyment (standing for intrinsic motivation), perceived value (standing for extrinsic motivation) and behavioural intention. The moderators in the MALT model are access and teacher support. It was also demonstrated that the perceived enablers, perceived enjoyment and perceived value have a significant positive influence on behavioural intention. However, perceived image does not have a direct significant influence on behavioural intention but is mediated by perceived value. The findings show that the perceived enablers have a significant positive influence on perceived enjoyment and perceived value. Also, perceived value has a significant positive influence on perceived enjoyment, and this is where extrinsic motivation can influence intrinsic motivation. A remarkable result is that in contradiction to most of the TAM models this study model (MALT) found that PV is not the strongest predictor of behavioural intention, instead perceived enjoyment is the strongest predictor of behavioural intention to use tablets for learning in MALT model.

The study also aimed to explore the barriers to tablet use and to identify how students prefer to use tablets in learning. Findings from the first and second phases show that the barriers that deter students from using tablets for learning are sight worries, limited resources, boredom and distraction, mobile device characteristics, discipline, and personal preference. It was also identified that students prefer to use tablets to accomplish academic tasks, to communicate with each other and take part in online discussions, and to search online for information. Using the tablet as a learning tool, students also find ways to support their own individual learning styles. All of the above can be done inside or outside the classrooms.

Based on the research findings of this study, it can be seen that the MALT model gives a better understanding of female undergraduate students' motivation and acceptance of tablet use for learning. The integration of technology acceptance model (TAM) with self-determination theory (SDT) has worked well in the study context. The study has also showed the applicability of integrating the original technology acceptance model (TAM) and self-determination theory (SDT) in predicting and explaining students' motivation and acceptance of tablet use for learning in the MALT model. This study has tried to understand students' extrinsic and intrinsic motivation to use tablets for learning. In KSA, the acceptance of new mobile devices is also growing. Thus, m-learning has been widely accepted in KSA, and the country is currently investing greatly in ICT for schools and higher education (HE) as well. This study indicates that HE students have high levels of acceptance and motivation to use tablets in their learning. Finally, it must be pointed out that this is not a call to replace live classroom teaching with tablet technology, but that tablets are convenient, popular and practical tools with which to effectively enhance learning in higher education.

8.2 Recommendations

Although we can find useful overviews of m-learning, we still need a better representation of the educational potential of m-learning with which to approach educational policy makers. Mobile technologies have improved dramatically in recent years, attracting considerable interest from the education sectors. It is important that educational institutions provide full support to the students and faculty members who use mobile learning. For example, universities need to provide training to both students and teachers on how to use tablets effectively in teaching and learning. Administrators and faculties are becoming increasingly confused about the benefits and usefulness of wireless and handheld devices in the context of higher education learning, and this could be one of the reasons why m-learning is not widely used in HE. A case study in KSA found that although m-learning makes education more convenient than in the past, it requires good wireless network bandwidth in order for it to work well. This is in line with the present study, which reveals similar findings. It has been suggested in the literature that developing countries should focus more on improving their technological infrastructures such as accessibility and connectivity. Thus, if tablets combine with wireless classrooms, learning could be enhanced through better collaboration.

Furthermore, designers and developers of ICT should begin to consider the implications of mobile technology on modern teaching and learning environments. Designers can deliver successful higher education products to the present generation of learners by means of mobile technologies. This can make mobile technology a particularly effective tool for the delivery and reinforcement of content that is specific to the higher education context. Thus, mobile learning designers need to design mobile learning applications that are easy to use and improve students' performance. The ease of use and value of a mobile learning system can add value to existing learning management systems by improving students' learning experiences and increasing their acceptance of m-learning.

Higher education institutions should not only focus on delivering content to students, they should also motivate students to find, identify, manipulate and evaluate existing knowledge, and to integrate this knowledge in their world in order to solve problems and communicate with others. By implementing mobile learning environments, students can be motivated to do all of this. Although numerous universities have already designed software to be used with tablets, along with best practice guidelines for educators and students, tablets are gradually making their way into higher education contexts. Undergraduate students participating in a previous study at King Saud University, KSA, showed high levels of readiness to use m-learning and it was established that there was a demand for university support of m-learning technology. Further research also found that readiness to use m-learning among students at Taibah University, KSA, was also high. This study

adds to these findings by demonstrating high levels of students' acceptance and motivation to use tablets for learning at King Abdulaziz University, KSA.

8.3 Contribution to Knowledge

This research has made several important contributions to our current knowledge mobile learning use in higher education. Firstly, a validated metric for assessing the motivation for and acceptance of tablet use in higher education has been designed. Secondly, a new research model has been developed which relates the factors of motivation to use and acceptance of tablet computers use for learning in the context of higher education. This model has been named the motivation and acceptance of learning with tablet model (MALT) and is an integration of the original TAM and SDT which examines tablet use in a new context and adds new constructs to expand the scope of the theoretical mechanisms proposed in the TAMs. Third, this research takes a systematic mixed methods triangulation and factor analysis approach, including structural equation modelling, to identify and understand the factors influencing students' motivation to use and accept tablets for learning. Fourth, the research draws on the statistical results to make recommendations that can be brought to the attention of policy makers in higher education in KSA. Fifth, it also identifies the ways in which students use or intend to use tablets in their learning as well their perceived barriers to tablet use.

8.4 Limitations and Future Work

Although the findings of this study are encouraging and useful, it has a number of limitations, as do most field surveys. To begin with, the study was carried out at only one university and the data was gathered from only female students. It is suggested that future studies could be conducted at multiple universities in KSA and include both genders in the sample. It does, however, provide rich data in the context of the University in question and can be used as a model to investigate and to support pedagogical development in other contexts.

In addition, on testing different groups of 'previous experience of tablet use' as a moderator in the MALT model, it was shown that there was no statistically significant difference between groups in the model, which contradicts many TAM models where experience acts as a moderator. A possible explanation for this statistical result is that the sample size for the two groups was not the same. So, it is suggested that future work should take account of experience as a moderator, and try to use the same sample size in the different groups.

Furthermore, research using the MALT model needs to be replicated in order to ensure it is valid. Testing this model in other settings would be an interesting and valuable way of establishing the external validity of model. According to Muijs (2004), we can be confident that our model is valid and fit only if we can replicate it over time and find that it keeps fitting.

It would be useful to design an experimental study to investigate whether students actually engage more in learning when using tablets, since adopting technology for technology's sake does not guarantee better learning outcomes (Mang & Wardley, 2012) or enriched educational experiences (Fischer et al., 2013). However, the outcomes of m-learning research do suggest that tablet use has a direct influence on student learning (Moran et al., 2010). There is still a significant gap in the literature on the impact of tablets in education (Clarke & Svanaes, 2014).

Additionally, future studies could focus on teacher readiness and awareness, and investigate the right pedagogy for tablet use in the HE context. Many academics in higher education avoid using newer technologies for learning and teaching (Johnson et al., 2013) due to factors such as lack of time or negative attitude. Thus, teacher readiness, awareness, attitudes and behavioural intention to use tablet for pedagogy could usefully be investigated. It can be suggested that the MALT model could be an appropriate tool to investigate this.

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Appendices

Appendix A: Table of the Literature Review Chapter

Table 20 Summary of technology acceptance models and theories

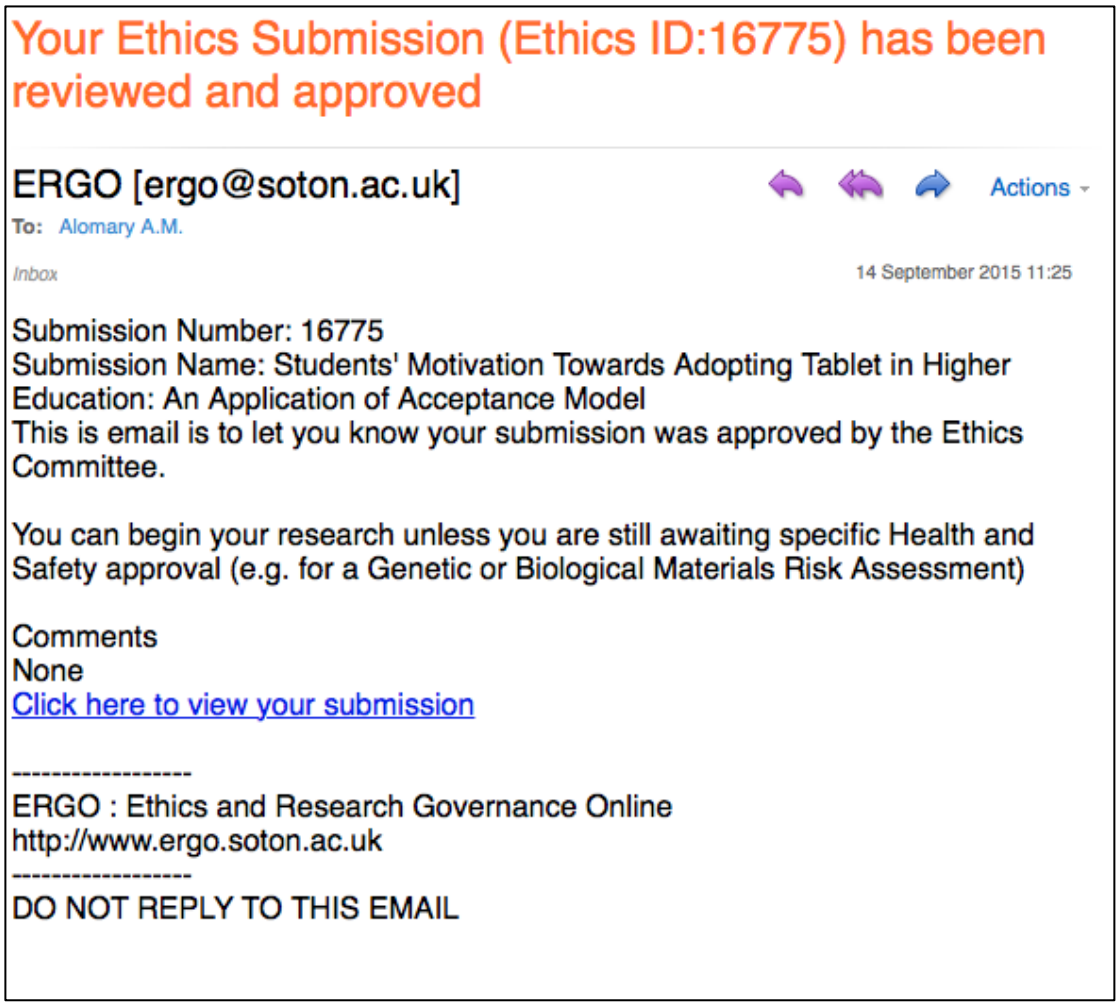
NO.	Models and Theories	Factors	Notes
1	Theory of Reasoned Action (TRA) Ajzen & Fishbein, (1975)	• Attitude • Subjective norm • Behavioural Intention • Actual Behaviour	It is the foundation and basis for the rest of the models. The TRA is a very general model but it can be used to predict technology behaviour as it has acted as a starting point for several other technology acceptance models.
2	Technology Acceptance Model (TAM) Fred Davis (1989)	• Perceived Usefulness • Perceived Ease of Use • Attitude • Behavioural Intention • Actual Behavioural	TAM focuses on user acceptance of technology. It assumes 'belief-attitude-intention-behaviour' relationship predicts and explains user's acceptance of a technology.
3	Motivational Model (MM) Davis et al. (1992)	• Constructs of TAM • Extrinsic Motivation (Perceived usefulness) • Intrinsic Motivation (perceived Enjoyment)	Addition of motivation component to TAM. It relates pleasure to technology acceptance. The model gives over emphasis to the motivation component (intrinsic and extrinsic).
4	Combined TAM+TPB Taylor and Todd (1995)	• Relative advantage • Complexity • Compatibility • Normative influence • Subjective norms • Control belief	It links the predictors of TPB with the constructs of perceived usefulness and ease of use from TAM.

Appendix A

		• Self-efficacy • Facilitating conditions • Attitude • Intention • Behaviour	
5	Extension of TAM (TAM2) Venkatesh &Davis, (2000)	• Subjective norm • Image • Job relevance • Output quality • Result demonstrability • Perceived ease of use • Perceived usefulness • Intention • Behaviour • Experience • Voluntariness	It studies the intervening effect of experience and voluntariness of the user. It gives particular attention to the perceived usefulness.
6	Unified Theory of Acceptance and Use of Technology Model (UTAUT) by Venkatesh et al. (2003)	• Performance Expectancy • Effort Expectancy • Social Influence • Facilitating Conditions • Behavioural intention • Usage behaviour • Gender • Age • Experience • Voluntariness of use	The model considers most of the previous models which have relevance to the use of new technology. It has been validated by longitudinal study.
7	Technology Acceptance Model 3 (TAM3) Venkatesh and Bala (2008)	• Constructs of TAM 2 • Computer Self-efficacy • Perception of external control • Computer playfulness • Computer anxiety • Perceived enjoyment • Objective usability	It is focused more on the determinants of perceived ease of use. It is suggested that none the determinants of perceived ease of use affect perceived usefulness and vice versa.
8	Extending Unified Theory of Acceptance and Use of Technology Model (UTAUT2) Venkatesh et al. (2012)	• Performance Expectancy • Effort Expectancy • Social Influence • Facilitating Conditions • Behavioural intention • Usage behaviour • Hedonic Motivation • Price value	The model considers the habit of the user, hedonic motive of the use and the price value linked to the usage. It is related more to the consumer context.

		• Habit • Gender • Age • Experience	

Appendix B: Ethics



Your Ethics Submission (Ethics ID:16775) has been reviewed and approved

ERGO [ergo@soton.ac.uk] Actions

To: Alomary A.M.

Inbox 14 September 2015 11:25

Submission Number: 16775
Submission Name: Students' Motivation Towards Adopting Tablet in Higher Education: An Application of Acceptance Model
This is email is to let you know your submission was approved by the Ethics Committee.

You can begin your research unless you are still awaiting specific Health and Safety approval (e.g. for a Genetic or Biological Materials Risk Assessment)

Comments
None
Click here to view your submission

ERGO : Ethics and Research Governance Online
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Figure 18 Ethics approved by the University of Southampton

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(٠٣٥)

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سعادة الملحق الثقافي بسفارة المملكة العربية السعودية في لندن **حفظه الله**

السلام عليكم ورحمة الله وبركاته

جامعة الملك عبد العزيز تهدي سعادتكم تحياتها. وتشير إلى الطلب المقدم من المبتعثة/ عزه بنت محمد العمري، المبتعثة من قبل وزارة التعليم لدراسة الدكتوراه بجامعة ساوثهامبتون، والتي ترغب في القيام برحلة علمية ، لجمع معلومات تتعلق بموضوع أطروحتها للدكتوراه للقيام بها في جامعة الملك عبد العزيز.

في هذا السياق نفيد سعادتكم بأن الجامعة لا تمانع من قيام المبتعثة بتطبيق دراستها لديها. علماً بأن ضوابط توزيع الاستبانات بجامعة الملك عبد العزيز مرفوعة على الرابط التالي:

http://graduatestudies.kau.edu.sa/content.aspx?Site_ID=306&lng=AR&nid=24157984&RL=www.kau.ed

وممكن للطالبة التواصل مع عمادة الدراسات العليا لطلب المساعدة عن طريق وحدة الخدمات البحثية.

وذلك من خلال الإيميل التالي: dgsg.rsc@kau.edu.sa

وتقبلوا خالص تحياتي وتقديري...

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للدراسات العليا والبحث العلمي المكلف

أ.د. عبدالفتاح بن سليمان محمد مشاط

Encl.: ..... المرفقات: Date: ١٤٣٧/٨/٥ التاريخ: Ref.: د/٤٧/٩٦٠٤٠ الرقم:

Figure 19 Ethics approved by King Abdulaziz University

Appendix C: Qualitative Data Collection Schedules And Analysis

C.1 First Phase Interview In English

Interview Questions

1. Can you tell me which way do you prefer to learn?

2. Who does the best lecture? Why?

3. What do you do when you get board in the class during the lecture?

4. Do you own any kind of technology? What is it?

5. Why do you think students use technology?

6. Do you use technology in learning? (If no move to 7, if yes, ask "what kind of technology?")

7. How does the university help you to use technology in learning?

8. Do you think that teachers' support might help you in using technology in learning? How?

9. Have you ever heard about mobile learning? (If no move to 11, if yes, ask 10)

10. From your point of view, can you tell me what mobile learning means?

11. Have you used mobile technology to learn?

12. Do you like the idea of using mobile in learning? Why?

13. Do you think mobile technology can make your learning better? (If no, ask “why”, If yes ask “How”?)

14. Do you have any idea about tablet? (if no ask "what are the reasons that prevent you from using or hearing about any kind of new technology?" then ask 27 , if yes, ask 15)

15. Do you have any experience in using tablet? Can you describe it?

16. Do you use tablet in learning? (if no move to 17, if yes, ask "How many hours per day")

17. What is the difference between tablets and other mobile technologies? Give examples?

18. Do you like using tablet in learning? Why?

19. What are the affordances and limitations for using tablet personally?

20. What are the affordances and limitations for using tablet in the university?

21. How easy is the use of tablet in learning?

22. Do you think tablet might influence your learning achievement? (if yes ask, " How?")

23. Do you think tablet might influence your enjoyment of learning? (if yes ask, " How?")

24. Do you have a particular skill in using tablet? (if no move to 26, if yes, ask 25)

25. What kind of skill do you have and how did you gain it?

26. Do you think you are confident about using tablet in learning?

27. Where can you have access to the Internet?

28. How (through what) can you access to the Internet? 3g/4g, DSL, Wi-Fi, else

29. If the university decides to provide all students with tablets, would you consider using it in learning? (if no , finish, if yes, ask 30)

30. In what way you will use tablet for learning?

C.2 First Phase Interview In Arabic and its Accreditation

OFESSIONAL TRANSLATION
Proprietor: Khalid Hadaidi
License No. 408
J.C.C. No. 226726
C.R. No. 4030283743

مكتب المحترف للترجمة
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رقم العضوية ٢٢٦٧٢٦
رقم السجل التجاري ٤٠٣٠٢٨٣٧٤٣

إقـرار

يقر مكتب المحترف للترجمة بأن النص المرفق باللغة الإنجليزية هو
ترجمة للوثيقة المرفقة باللغة العربية أو العكس

ACKNOWLEDGMENT

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Interview Questions

1. Can you tell me which way do you prefer to learn?
2. Who does the best lecture? Why?
3. What do you do when you get board in the class during the lecture?
4. Do you own any kind of technology? What is it?
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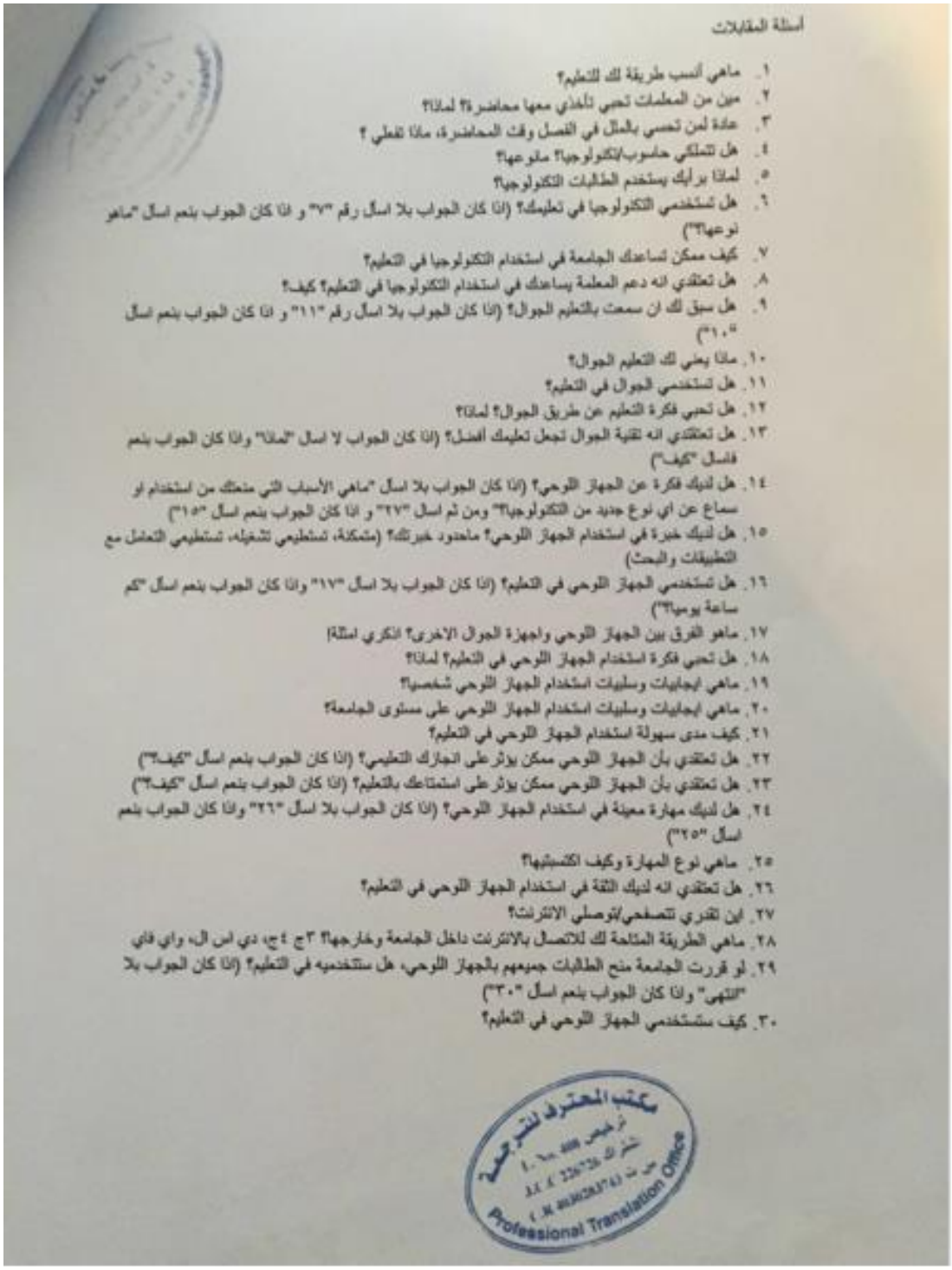
17. What is the difference between tablets and other mobile technologies? Give examples?
18. Do you like using tablet in learning? Why?
19. What are the affordances and limitations for using tablet personally?
20. What are the affordances and limitations for using tablet in the university?
21. How easy is the use of tablet in learning?
22. Do you think tablet might influence your learning achievement? (if yes ask, " How?")
23. Do you think tablet might influence your enjoyment of learning? (if yes ask, " How?")
24. Do you have a particular skill in using tablet? (if no move to 26, if yes, ask 25)
25. What kind of skill do you have and how did you gain it?
26. Do you think you are confident about using tablet in learning?
27. Where can you have access to the internet?
28. How (through what) can you access to the internet? 3g/4g, DSL, WiFi, else
29. If the university decides to provide all students with tablets, would you consider using it in learning? (if no , finish, if yes, ask 30)
30. In what way you will use tablet for learning?

Appendix C



أسئلة المقابلات

١. ماهي أنسب طريقة لك للتعليم؟
٢. بين من المعلمات تحبي تأخذي معها محاضرة؟ لماذا؟
٣. عادة لمن تحسي بالملل في الفصل وقت المحاضرة، ماذا تفعلي ؟
٤. هل تتملكي حاسوب/تكنولوجيا؟ ماهو نوعها؟
٥. لماذا برأيك يستخدم الطالبات التكنولوجيا؟
٦. هل تستخدمي التكنولوجيا في تعليمك؟ (اذا كان الجواب بلا اسأل رقم "٧" و اذا كان الجواب بنعم اسأل "ماهو نوعها؟")
٧. كيف ممكن تساعدك الجامعة في استخدام التكنولوجيا في التعليم؟
٨. هل تعتقدي انه دعم المعلمة يساعدك في استخدام التكنولوجيا في التعليم؟ كيف؟
٩. هل سبق لك ان سمعت بالتعليم الجوال؟ (اذا كان الجواب بلا اسأل رقم "١١" و اذا كان الجواب بنعم اسأل "١٠")
١٠. ماذا يعني لك التعليم الجوال؟
١١. هل تستخدمي الجوال في التعليم؟
١٢. هل تحبي فكرة التعليم عن طريق الجوال؟ لماذا؟
١٣. هل تعتقدي انه تقنية الجوال تجعل تعليمك أفضل؟ (اذا كان الجواب لا اسأل "لماذا" واذا كان الجواب بنعم فاسأل "كيف")
١٤. هل لديك فكرة عن الجهاز اللوحي؟ (اذا كان الجواب بلا اسأل "ماهي الأسباب التي منعتك من استخدام او سماع عن اي نوع جديد من التكنولوجيا؟" ومن ثم اسأل "١٧" و اذا كان الجواب بنعم اسأل "١٥")
١٥. هل لديك خبرة في استخدام الجهاز اللوحي؟ ماحدود خبرتك؟ (متمكنة، تستطيعي تشغيله، تستطيعي التعامل مع التطبيقات والبحث)
١٦. هل تستخدمي الجهاز اللوحي في التعليم؟ (اذا كان الجواب بلا اسأل "١٧" واذا كان الجواب بنعم اسأل "كم ساعة يوميا؟")
١٧. ماهو الفرق بين الجهاز اللوحي واجهزة الجوال الاخرى؟ اذكري امثلة
١٨. هل تحبي فكرة استخدام الجهاز اللوحي في التعليم؟ لماذا؟
١٩. ماهي ايجابيات وسلبيات استخدام الجهاز اللوحي شخصيا؟
٢٠. ماهي ايجابيات وسلبيات استخدام الجهاز اللوحي على مستوى الجامعة؟
٢١. كيف مدى سهولة استخدام الجهاز اللوحي في التعليم؟
٢٢. هل تعتقدي بأن الجهاز اللوحي ممكن يؤثر على انجازك التعليمي؟ (اذا كان الجواب بنعم اسأل "كيف؟")
٢٣. هل تعتقدي بأن الجهاز اللوحي ممكن يؤثر على استمتاعك بالتعليم؟ (اذا كان الجواب بنعم اسأل "كيف؟")
٢٤. هل لديك مهارة معينة في استخدام الجهاز اللوحي؟ (اذا كان الجواب بلا اسأل "٢٦" واذا كان الجواب بنعم اسأل "٢٥")
٢٥. ماهي نوع المهارة وكيف اكتسبتيها؟
٢٦. هل تعتقدي انه لديك الثقة في استخدام الجهاز اللوحي في التعليم؟
٢٧. اين تقدري تتصفحي/توصلي الانترنت؟
٢٨. ماهي الطريقة المناسبة لك للاتصال بالانترنت داخل الجامعة وخارجها؟ ٣ج ٤ج، دي اس ال، واي فاي
٢٩. لو قررت الجامعة منح الطالبات جميعهم بالجهاز اللوحي، هل ستتخدميه في التعليم؟ (اذا كان الجواب بلا "انتهى" واذا كان الجواب بنعم اسأل "٣٠")
٣٠. كيف ستستخدمي الجهاز اللوحي في التعليم؟

C.3 Third Phase Interview In English

1. What do you think of the relationship between the following variables:

1. Perceived value and behavioural intention to use tablet for learning.
2. Perceived value and perceived enjoyment of using tablet for learning.
3. Perceived enablers and behavioural intention to use tablet for learning.
4. Perceived enablers and perceived value of using tablet for learning.
5. Perceived enablers and perceived enjoyment of using tablet for learning.
6. Perceived enjoyment and behavioural intention to use tablet for learning.
7. Perceived image and perceived value of using tablet for learning.

2. Do you think the followings can moderate the relationship between perceived enjoyment / perceived value and behavioural intention to use tablet for learning?

1. Access
2. Teacher support

3. Do you think that this model (MALT) gives a better understanding of students' motivation and acceptance to use tablet computers for learning?

4. Overall, what do you think of the model?

Appendix C

C.4 Third Phase Interview In Arabic

أسئلة مقابلات المرحلة الثالثة

١. مارأيك في العلاقة بين المتغيرات التالية:

١. القيمة المدركة للجهاز اللوحي مع النية السلوكية لاستخدام الجهاز اللوحي في التعلم
٢. القيمة المدركة للجهاز اللوحي مع المتعة المدركة عند استخدام الجهاز اللوحي في التعلم
٣. العوامل المساعدة المدركة مع النية السلوكية لاستخدام الجهاز اللوحي في التعلم
٤. العوامل المساعدة المدركة مع القيمة المدركة لاستخدام الجهاز اللوحي في التعلم
٥. العوامل المساعدة المدركة مع المتعة المدركة عند استخدام الجهاز اللوحي في التعلم
٦. المتعة المدركة مع النية السلوكية لاستخدام الجهاز اللوحي في التعلم
٧. المكانة الاجتماعية المدركة مع القيمة المدركة لاستخدام الجهاز اللوحي في التعلم

٢. هل تتوقعي انه العناصر التالية ممكن تأثر على العلاقة مابين المتعة المدركة / القيمة المدركة مع النية السلوكية لاستخدام الجهاز اللوحي في التعلم

١. إمكانية الوصول للإنترنت
٢. دور المعلمة

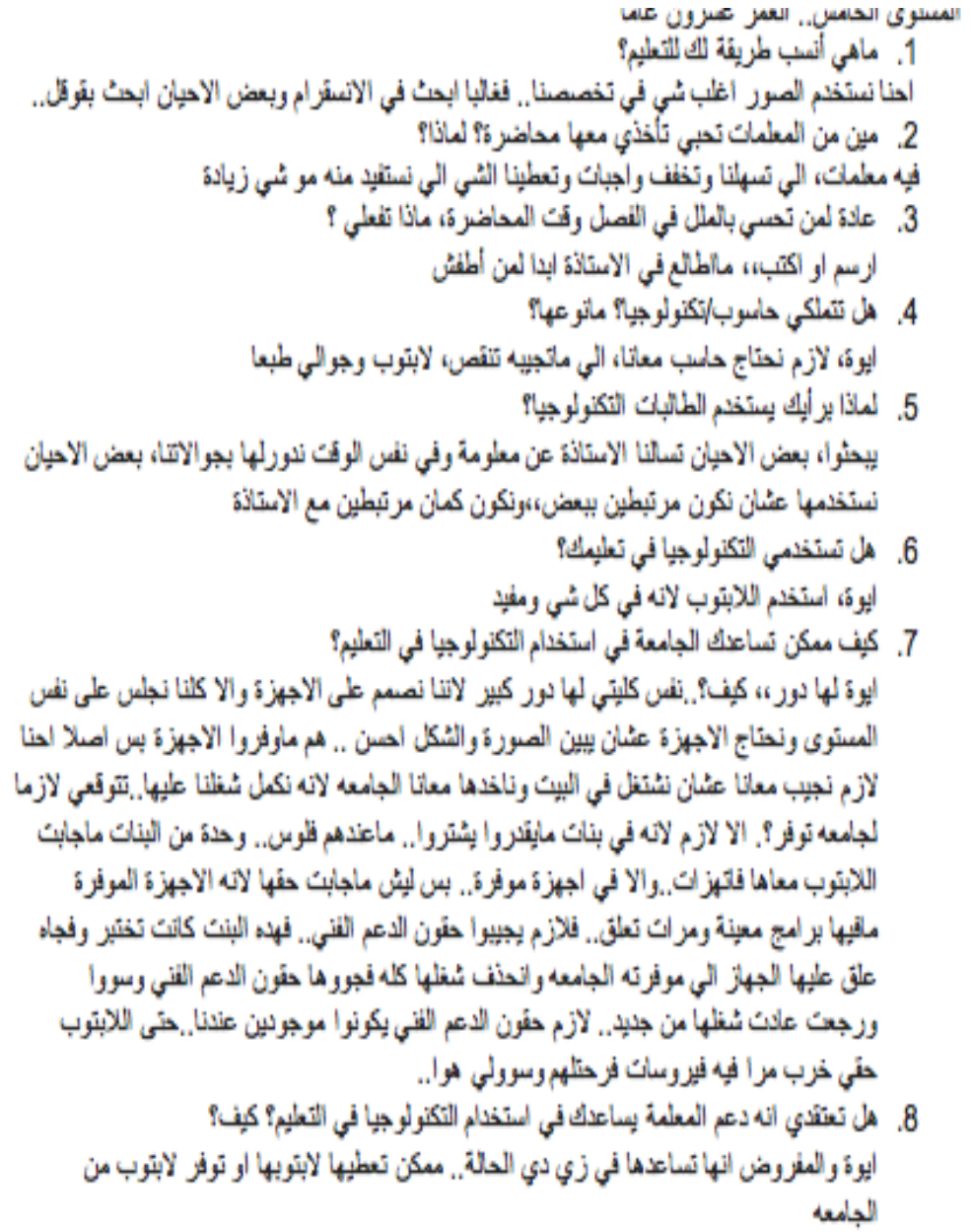
٣. هل تعتقدي انه النموذج (نموذج تحفيز وقبول الجهاز اللوحي في التعلم) يمنح فهم أفضل لقياس التحفيز والقبول للطالبات لاستخدام الجهاز اللوحي في التعلم؟

٤. بصفة عامة، ماهي وجهك نظرك على النموذج؟

C.5 Example of Interview Analysis

Step one: Familiarising myself with my data.

I transcribed the data by myself and read and reread the data. The following figures are example from the first phase and third phase interviews.



المستوى الخامس.. العمر عشرون عاما

1. ماهي أنسب طريقة لك للتعليم؟

احنا نستخدم الصور اغلب شي في تخصصنا.. فغالبا ابحث في الانسقرام وبعض الاحيان ابحث بقوقل..

2. مين من المعلمات تحبي تأخذي معها محاضرة؟ لماذا؟

فيه معلمات، الي تسهلنا وتخفف واجبات وتعطينا الشي الي نستفيد منه مو شي زيادة

3. عادة لمن تحسي بالملل في الفصل وقت المحاضرة، ماذا تفعلي ؟

ارسم او اكتب،، ماأطالع في الاستاذة ابدا لمن أطفش

4. هل تتملكي حاسوب/تكنولوجيا؟ ماتوعها؟

ايوة، لازم نحتاج حاسب معانا، الي ماتجيبه تنقص، لابتوب وجوالي طبعا

5. لماذا برأيك يستخدم الطالبات التكنولوجيا؟

يبحثوا، بعض الاحيان تسألنا الاستاذة عن معلومة وفي نفس الوقت ندورلها بجوالاتنا، بعض الاحيان نستخدمها عشان نكون مرتبطين ببعض،،ونكون كمان مرتبطين مع الاستاذة

6. هل تستخدمي التكنولوجيا في تعليمك؟

ايوة، استخدم اللابتوب لانه في كل شي ومفيد

7. كيف ممكن تساعدك الجامعة في استخدام التكنولوجيا في التعليم؟

ايوة لها دور،، كيف؟..نفس كليتي لها دور كبير لاننا نصمم على الاجهزة والا كلنا نجلس على نفس المستوى ونحتاج الاجهزة عشان يبين الصورة والشكل احسن .. هم ماوفروا الاجهزة بس اصلا احنا لازم نجيب معانا عشان نشتغل في البيت وناخدها معانا الجامعه لانه نكمل شغلنا عليها..تتوقعي لازما لجامعه توفر؟. الا لازم لانه في بنات مايقدروا يشتروا.. ماعندهم فلوس.. وحدة من البنات ماجابت اللابتوب معاها فاتهزات..والا في اجهزة موفرة.. بس ليش ماجابت حقها لانه الاجهزة الموفرة مافيها برامج معينة ومرات تعلق.. فلازم يجيبوا حقون الدعم الفني.. فهذه البنت كانت تختبر وفجاه علق عليها الجهاز الي موفرته الجامعه وانحذف شغلها كله فجووها حقون الدعم الفني وسووا ورجعت عادت شغلها من جديد.. لازم حقون الدعم الفني يكونوا موجودين عندنا..حتى اللابتوب حقي خرب مرا فيه فيروسات فرحتلهم وسوولي هوا..

8. هل تعتقدي انه دعم المعلمة يساعدك في استخدام التكنولوجيا في التعليم؟ كيف؟

ايوة والمفروض انها تساعدها في زي دي الحالة.. ممكن تعطيها لابتوبها او توفر لابتوب من الجامعه

Figure 20 Example of first phase transcription

Appendix C

سؤالي: مارأيك في العلاقة مابين العوامل المساعدة والمتعة؟ هل فعلا تأثر العوامل المساعدة على المتعة على طالبات البكالويوروبس في السعودية؟

امم..انا من وجهة نظري أتوقع انه فعلا انه الطالبة تستمع بالتابليت لمن يكون سهل الاستخدام..هذا موجود..عامل السهولة والعوامل المساعدة شي مهم في كل شي في الحياه..اذا اتوفرت العوامل المساعدة حيكون استخدام التابليت في التعليم ممتع وحينجزوا في دراستهم أكثر..

سؤالي: انت قلتي حيستمتعوا وينجزوا أكثر؟!

فعلا..اذا أدركت الطالبة انه لديها العوامل المساعدة لاستخدام التابليت في التعليم فمعناته هي حتنجز وتعطي أكثر وتفهم وبالتالي انتاجيتها تزيد..ممكن تكتب واجباتها أسرع..تنجز أسرع..ففعلا عامل العوامل المساعدة تأثر على استمتاع وانتاجية وأداء الطالبات..

سؤالي: طيب..هل العوامل المساعدة تاثر على نية استخدامه؟

فعلا..هم الطالبات محاينووا استخدام التابليت في التعليم الا انهم داركين للعوامل المساعدة له السهولة والتنقل والمقدرة على استخدامه..علاقة منطقية تماما..مرتبطة مع بعض..بس أكرر عامل السهولة بالذات له دور كبير.. قالت عائشة رضي الله عنها: (ماخير النبي صلى الله عليه وسلم بين أمرين الا اختار أيسرهما مالم يأثم)..

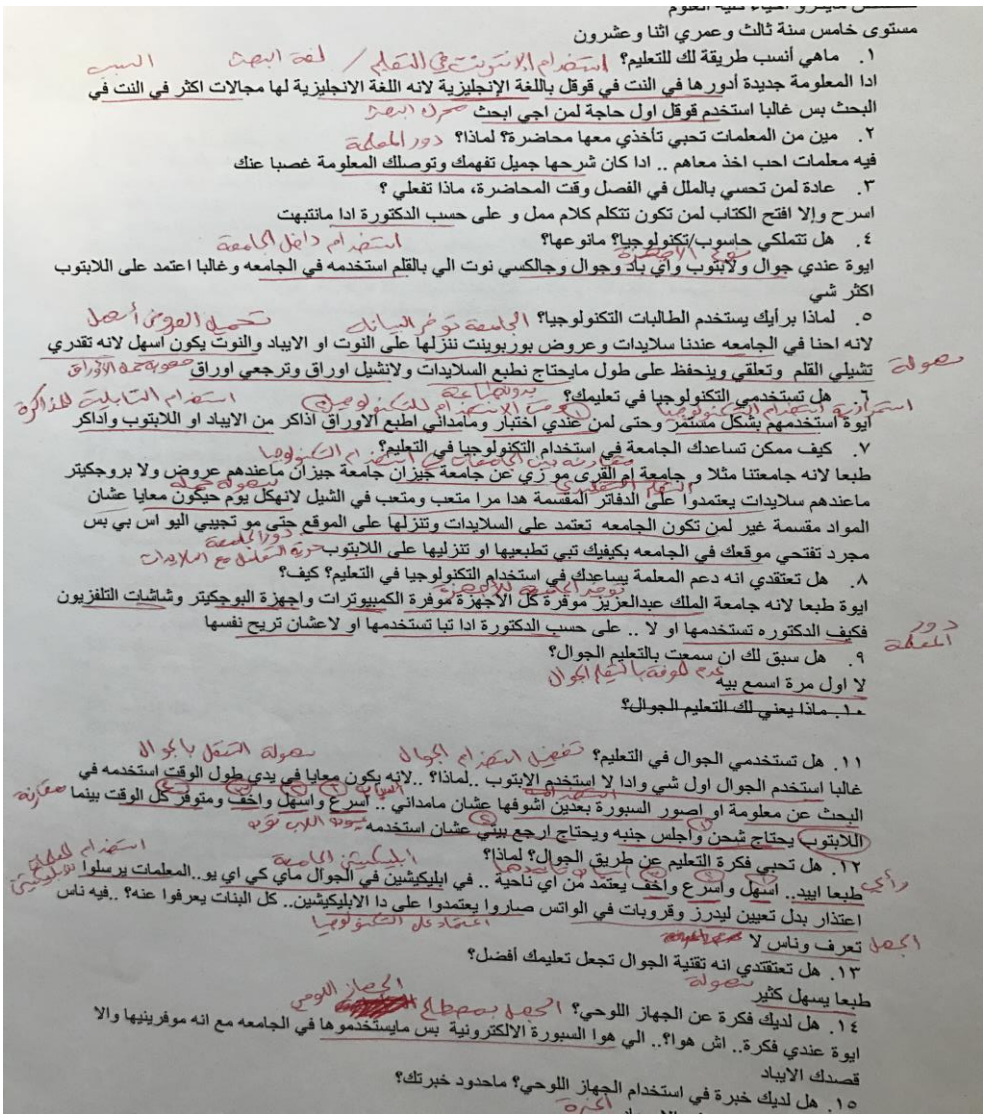
سؤالي: هل المكانه او الإعتبار تاثر على اي عامل في النموذج؟

إلا تاثر..أنا أحس المكانة هي انترينسيك..أنا عندي هذا الشيئ في بحثي الدكتوراه أتمنى انه الناس تقول هذه دكتورة وتكون لي مكانة في مجتمعي.. فهم الطالبات ممكن يستخدموا التابليت عشان المكانة بين صاحباتهم وفي مجتمعهم يكون لهم اعتبار..الايميج مرا مهم في المجتمع السعودي..لمن يكون غرضي المكانة بين الصاحبات معناته ادور على شي سهل فأتوقع انه كان في علاقة بين العوامل المساعدة و المكانة..يعني لمن تكون الطالبة مدركة بالعوامل المساعدة تضمن اعتبارها بين صاحباتها.. بالنسبة للقيمة.. ايوة مليها بينهم علاقة..هو أحد فوائد استخدام التابليت في التعليم انه يعطي الطالبات المكانة او الاعتبار بين الصاحبات..قصدك المكانه تعتبر فائدة؟ يعني هذه تعتبر فائدة أكيد..يعني لو قلتي اش فوائد استخدام التابليت في التعليم حتكون منها انها تعطيني المكانة بين صاحباتي..طيب واش بالنسبة للإنجاز الأكاديمي؟ أنا كنت أقصد مفيد بشكل عام..شخصيا مألحس انه فيه رابط بينهم.. المكانة والانجاز الاكاديمي..أحسهم مختلفين عن بعض.. بس ممكن اقلك انه مفيد بشكل عام..بس كإنجاز أو انه أقوي معلوماتي لا..

Figure 21 Example of third phase transcription

Step two: generating initial codes

The following figure is an example of generating initial codes. Code is “the most basic segment or information that can be assessed in a meaningful way regarding the research phenomena” (Braun & Clarke, 2006:18).



مستوى خامس سنة ثالث وعمري اثنا وعشرون

١. ماهي أنسب طريقة لك للتعليم؟
ادا المعلومة جديدة أدورها في النت في قوقل باللغة الإنجليزية لانه اللغة الانجليزية لها مجالات اكثر في النت في البحث بس غالبا استخدم قوقل اول حاجة لمن اجي ابحث

٢. مين من المعلمات تحبي تأخذي معها محاضرة؟ لماذا؟
فيه معلمات احب اخذ معاهم .. ادا كان شرحها جميل تفهمك وتوصلك المعلومة غصبا عنك

٣. عادة لمن تحسي بالملل في الفصل وقت المحاضرة، ماذا تفعلي ؟
اسرح وإلا افتح الكتاب لمن تكون تتكلم كلام ممل و على حسب الدكتورة ادا مانتبهت

٤. هل تتملكي حاسوب/تكنولوجيا؟ مانوعها؟
ايوة عندي جوال ولابتوب واي باد وجوال وجالكسي نوت الي بالقلم استخدمه في الجامعه وغالبا اعتمد على اللابتوب اكثر شي

٥. لماذا برأيك يستخدم الطالبات التكنولوجيا؟
لانه احنا في الجامعه عندنا سلايدات وعروض بوربوينت ننزلها على النوت او الايباد والنوت يكون اسهل لانه تقدري تشيلي القلم وتعلقي وينحفظ على طول مايحتاج نطبع السلايدات ولانشيل اوراق وترجعي اوراق

٦. هل تستخدمي التكنولوجيا في تعليمك؟
ايوة استخدمهم بشكل مستمر وحتى لمن عندي اختبار ومامدائي اطبع الاوراق اذاكر من الايباد او اللابتوب واذاكر

٧. كيف ممكن تساعدك الجامعة في استخدام التكنولوجيا في التعليم؟
طبعا لانه جامعتنا مثلا و جامعة ام القرى مو زي عن جامعة جيزان جامعة جيزان ماعندهم عروض ولا بروجكيتر ماعندهم سلايدات يعتمدوا على الدفاتر المقسمة هدا مرا متعب ومتعب في الشيل لانهكل يوم حيكون معايا عشان المواد مقسمة غير لمن تكون الجامعه تعتمد على السلايدات وتنزلها على الموقع حتى مو تجيبي اليو اس بي بس مجرد تفتحي موقعك في الجامعه بكيفيك تبي تطبعيها او تنزليها على اللابتوب

٨. هل تعتقدي انه دعم المعلمة يساعدك في استخدام التكنولوجيا في التعليم؟ كيف؟
ايوة طبعا لانه جامعة الملك عبدالعزيز موفرة كل الاجهزة موفرة الكمبيوترات واجهزة البوجكيتر وشاشات التلفزيون فكيف الدكتوره تستخدمها او لا .. على حسب الدكتورة ادا تبا تستخدمها او لاعشان تريح نفسها

٩. هل سبق لك ان سمعت بالتعليم الجوال؟
لا اول مرة اسمع بيه

١٠. ماذا يعني لك التعليم الجوال؟

١١. هل تستخدمي الجوال في التعليم؟
غالبا استخدم الجوال اول شي وادا لا استخدم الابتوب ..لماذا؟ ..لانه يكون معايا في يدي طول الوقت استخدمه في البحث عن معلومة او اصور السبورة بعدين اشوفها عشان مامدائي .. اسرع واسهل واخف ومتوفر كل الوقت بينما اللابتوب يحتاج شحن واجلس جنبه ويحتاج ارجع بيتي عشان استخدمه

١٢. هل تحبي فكرة التعليم عن طريق الجوال؟ لماذا؟
طبعا ابيد.. اسهل واسرع واخف يعتمد من اي ناحية .. في ابليكيشين في الجوال ماي كي اي بو..المعلمات يرسلوا اعتذار بدل تعيين ليدرز وقروبات في الواتس صاروا يعتمدوا على دا الابليكيشين.. كل البنات يعرفوا عنه؟ ..فيه ناس تعرف وناس لا

١٣. هل تعتقدي انه تقنية الجوال تجعل تعليمك أفضل؟
طبعا يسهل كثير

١٤. هل لديك فكرة عن الجهاز اللوحي؟
ايوة عندي فكرة.. اش هوا؟.. الي هوا السبورة الالكترونية بس مايستخدموها في الجامعه مع انه موفرينيها والا قصدك الايباد

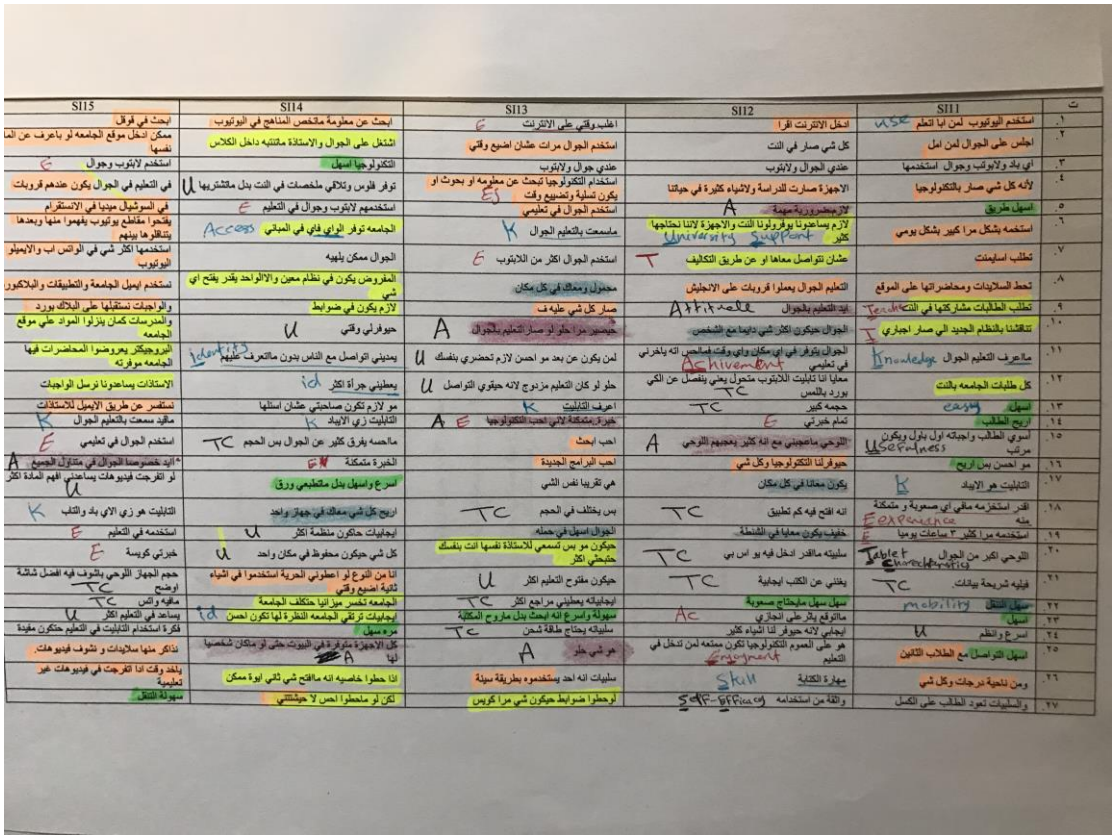
١٥. هل لديك خبرة في استخدام الجهاز اللوحي؟ ماحدود خبرتك؟

Figure 22 Example of generating initial codes

Step three: searching for themes

I collected all the nodes that are related to the codes in tables. A column includes a participant and a row include nodes for each participant. Nodes refer to the participants' quotes that represent codes. All the codes are categorised (i.e. collecting similar codes together). The following figure illustrates this step.

Appendix C



ت	SI11	SI12	SI13	SI14	SI15
١.	استخدم اليوتيوب لمن انا اتعلم	ادخل الانترنت اقرا	اغلب وقتي على الانترنت	ابحث عن معلومة ماتخص المناهج في اليوتيوب	ابحث في قوقل
٢.	اجلس على الجوال لمن املل	كل شي صار في النت	استخدم الجوال مرات عشان اضيع وقتي	اشغل على الجوال والاستاذة ماتنبه داخل الكلاس	ممكن ادخل موقع الجامعه لو باعرف عن الما نفسها
٣.	اي باد ولابوتب وجوال استخدمها	عندي الجوال ولابتوب	عندي جوال ولابتوب	التكنولوجيا اسهل	استخدم لابتوب وجوال
٤.	لأنه كل شي صار بالتكنولوجيا	الاجهزة صارت للدراسة ولاشياء كثيرة في حياتنا	استخدام التكنولوجيا تبحث عن معلومه او بحوث او يكون تسلية وتضييع وقت	توفر فلوس وتلاقي ملخصات في النت بدل ماتشتريها	في التعليم في الجوال يكون عندهم قروبات
٥.	اسهل طريق	لازم بمدرسة مهمة	استخدم الجوال في تعليمي	استخدمهم لابتوب وجوال في التعليم	في السوشيال ميديا في الانستقرام
٦.	استخدمه بشكل مرا كبير بشكل يومي	لازم يساعدونا يوفرولنا النت والاجهزة لاننا نحتاجها كثير	مامسمعت بالتعليم الجوال	الجامعه توفر الواي فاي في المباني	يفتحوا مقاطع يوتيوب يفهموا منها ويعدها بتناقلوها بينهم
٧.	تطلب اسايمنت	عشان تتواصل معاها او عن طريق التكليف	استخدم الجوال اكثر من اللابتوب	الجوال ممكن بأهبه	استخدمها اكثر شي في الوانس اب والايميلو واليوتيوب
٨.	تحط السلايدات ومحاضراتها على الموقع	التعليم الجوال يعملوا قروبات على الانجليش	مجمول ومعاك في كل مكان	المفروض يكون في نظام معين والالواحد يقدر يفتح اي شي	تستخدم ايميل الجامعة والتطبيقات والبلاكبورد
٩.	تطلب الطالبات مشاركتها في النت	بيد التعليم بالجوال	صار كل شي عليه ف	لازم يكون في ضوابط	والواجبات تستقبلها على البلاك بورد
١٠.	تناقشنا بالنظام الجديد الي صار اجباري	الجوال حيكون اكثر شي دايما مع الشخص	خيسير مرا حلو لو صار التعليم بالجوال	حيوفرلي وقتي	والمدرسات كمان ينزلوا المواد على موقع الجامعه
١١.	ماعرف التعليم الجوال	الجوال يتوفر في اي مكان واي وقت فسالحس انه باخرني في تعليمي	لمن يكون عن بعد مو احسن لازم تحضري بنفسك	يعديني التواصل مع الناس بدون ماتعرف عليهم	البروجيكتر يعروضوا المحاضرات فيها الجامعه موفرته
١٢.	كل طلبات الجامعه بالنت	معايا انا تابليت اللابتوب متحول يعني بفصل عن الكي بورد باللمس	حلو لو كان التعليم مزدوج لانه حيقوي التواصل	يعطيني جرأة اكثر	الاستاذات يساعدونا نرسل الواجبات
١٣.	اسهل	حجمه كبير	اعرف التابليت	مو لازم تكون صاحبتي عشان استلها	نستفسر عن طريق الايميل للاستاذات
١٤.	اريح الطالب	تعلم خبرني	خبرة متمكنة لاني احب التكنولوجيا	التابلت زي الايباد	ماقيد سمحت بالتعليم الجوال
١٥.	اسوي الطالب واجباته اول بأول ويكون مرتب	اللوحي ماعجبني مع انه كثير يعجبهم اللوحي	احب ابحث	ماحسه بفرق كثير عن الجوال بس الحجم	استخدم الجوال في تعليمي
١٦.	مو احسن بس اريح	حيوفرلنا التكنولوجيا وكل شي	احب البرامج الجديدة	الخبرة متمكنة	* ايد مخصوصنا الجوال في متناول الجميع
١٧.	التابلت هو الايباد	يكون معانا في كل مكان	هي تقريبا نفس الشي	سرع واسهل بدل ماتطبعي ورق	لو انفرجت فيديوهات يساعدني افهم المادة اكثر
١٨.	اقدر استخدمه ماقي اي صعوبة و متمكنة منه	انه افتح فيه كم تطبيق	بس يختلف في الحجم	اريح كل شي معاك في جهاز واحد	التابلت هو زي الاي باد والتاب
١٩.	استخدمه مرا كثير ٣ ساعات يوميا	خفيف ويكون معايا في الشنطة	الجوال اسهل في حمله	ايجابيات حاكون منظمة اكثر	استخدمه في التعليم
٢٠.	اللوحي اكبر من الجوال	سلبيته مالقدر ادخل فيه يو اس بي	حيكون مو بس تسمعي للاستاذة نفسها انت بنفسك حتبحثي اكثر	كل شي حيكون محفوظ في مكان واحد	خبرتي كويسة
٢١.	فيليه شريحة بيانات	يغني عن الكتب ايجابية	حيكون مفتوح التعليم اكثر	انا من النوع لو اعطوني الحرية استخدموا في اشياء ثانية اضيع وقتي	حجم الجهاز اللوحي بالتوف فيه افضل شاشة اوضح
٢٢.	سهل التنقل	سهل سهل مايحتاج صعوبة	ايجابياته بعطيني مزاجيا اكثر	الجامعه تخسر مزاجيا حتكلف الجامعة	مافيه وانس
٢٣.	اسهل	مالموقع يأثر على انجازي	سهولة واسرع انه ابحث بدل ماروح المكتبة	ايجابيات تزعي الجامعه النظرة لها تكون احسن	يساعد في التعليم اكثر
٢٤.	اسرع و انظم	ايجابي لانه حيوفر لنا اشياء كثير	سلبياته يحتاج طاقة شحن	مره سهل	فكرة استخدام التابلت في التعليم حتكون مفيدة
٢٥.	اسهل التواصل مع الطلاب الثانين	هو على العموم التكنولوجيا تكون ممتعه لمن تدخل في التعليم	هو شي جلو	كل الاجهزة مايرة في البيوت حتى لو مكان شخصيا انها	نذاكر منها سلايدات و نشوف فيديوهات.
٢٦.	ومن ناحية درجات وكل شي	مهارة الكتابة	سلبيات انه احد يستخدموه بطريقة سيئة	انا حطوا خاصيه انه ماقدر شي ثاني ابوة ممكن	ياخذ وقت انا انفرجت في فيديوهات غير تعليمية
٢٧.	والسلبيات تعود الطالب على الكسل	واقفة من استخدامه	لو حطوا ضوابط حيكون شي مرا كويس	لكن لو ماحطوا احس لا حبشتني	سهولة التنقل

Figure 23 Searching for themes

Step four: reviewing themes

In inductive analysis, I collected all the similar codes first and then name the theme (Table 21). However in deductive analysis, I collected all the codes based on the specific themes (Table 22). The following tables are examples of inductive and deductive analysis.

Table 21 Example of inductive analysis

Inductive Analysis	
Codes (step 1)	Themes (step 2)
الاغلب صار يتقبل الجوال اكثر من انه احديشرح له ، فيه بنات مايحبوا يستغربوا مني كيف اداكر منه ، قريب من جيلنا الايباد، اصلا الطالب محاياخد وقت طويل عشان يتعلمبه زي المدرسين، لانه الطلاب اتعودوا علي التكنولوجيا اكثر من الاساتذة، جيل المعلمين غير عن جيل الطلاب، بس فيه دكاترة مابينزلوا ولاحاجة يالنظام القديم، اخواني الصغار احسن مني، اخوية الصغير يستخدم الجهاز اكثر مني، ماعاصروا الجيل حقنا والدكاترة الكبار دوبهم استخدموا، كتبنا قديمة ومهي ملونة، هي صغيرة والاستاذات الصغار دايما يكونواماخذين على البنات اكثر، الاغلب صار يتقبل الجوال اكثر من انه احديشرح له ، وبالدات في حياتنا دحين موجود الاجهزة في كل بيت والواحد عنده كم جهاز، دحين مع التطور فاتطورنا احنا، فممكن ببساطة اتعلم عليه، عندنا حب اكتشاف اكبر، انا من الجيل القديم، لو ماستخدمته احس نفسي قديمة، الطالبات صار ميولهم، يحبوا دا الشي يعني يكشخون فيها،	Digital identity
طريقة شرحها في كيف تستخدمي التكنولوجيا، جات دي الدكتورة وعلمتنا عليه ، لمن المعلمة تطلب يقوموا يستخدموا، فيه معلمات منظمات ينزلوا كل شي عن طريق النت ، ممكن الاستاذة ماتنتبه انه الطالبه داخلة معاها على نفس البرنامج، المدرسة تطلبنا واجب او بحث، لو المدرسين عرفوا كيف يتعاملوا مع التكنلوجيا وبيستخدموها حتصير متعه للطلاب، لو المدرس لو اخد الدورات حيعلمها الطلاب، تنزل جدولها ومحاضراتها واجوبة اختبارات السنة الي فاتت، الاستاذة ترسلنا كل شي ايميل، بعضهم تنزل محاضراتها على موقعها الخاص، تطلبنا نسوي تكليف عن بحث من النت، البحوث الي تطلبها، على حسب الدكتورة ادا بتستخدمها او لا، يطلبوا تكاليف بالكمبيوتر حتى لو كانت بسيطة، يلزمونا بشي حاسوبي، الاستاذات يرسول اعتذار عن طريق الابليكيشين، تطلب ايمنت، تحط الاسلايدات ومحاضراتها على الموقع، تكلب الطالبات المشاركة في النت، تناقشنا بالنظام الجديد، عشان نتواصل معاها او عن طريق التكاليف، والمدرسات كمان ينزلوا المواد علي موقع الجامعة،	Teacher support

Appendix C

	الاستاذات يساعدونا نرسل الواجبات، نستفسر عن طريق الايميل للاستاذات، جات دي الدكتورة وعلمتنا عليه ، قالت انها حتنزل محاضراتها وفيديوهات وعليها اسئلة، المدرسة تطلبنا واجب او بحث، طريقة شرحها في كيف تستخدمي التكنولوجيا، لانها ممكن الاستاذة ماتنتبه انه الطالبه داخلة معاها على نفس البرنامج، في بنات مايحبوا بس لمن المعلمة تطلب يقوموا يستخدموا، الاستاذة ترسلنا كل شي ايميل، بس لو احد علمني حاتعلم،
Mobility	لانه يتنقل من مكان لمكان معايا، واسرع واسهل في التنقل، اقدر اشيله معايا في كل مكان، اخده معايا للمستشفى، متوفر في كل وقت ومكان، فين مارحت معايا، معانا طول الوقت، يكون معايا في يدي طول الوقت، ماله حدود في المكان، في ناس مايقدروا يجو الجامعه فهدا حل ازمتهم، الناس البعيدين الي في القرى فعلا فك ازمتهم، متوفر كل الوقت، يستخدموه الي مايقدروا يوصل الجامعة، متناول، حيخلي المنهج الدراسي معايا في كل مكان، حيكون اكثر شي دايما مع الشخص ، يتوفر في اي مكان واي وقت فمااحس اته ياخرني في تعليمي، يكون معانا في كل مكان، سهل التنقل، اشيل محاضراتي معايا في الجهاز واشيله معايا في كل مكان، محمول ومعاك في كل مكان، سهولة التنقل، الايباد اكثر حاجة لانه يتنقل من مكان لمكان معايا ، حاستخدمه وقت ماالحتاجه وفي اشياء ثانية، اشيله احسن معايا، استخدمه اسرع واتنقل فيه اكثر دايما معايا، واسهل في التنقل، ، ي كل مكان اقدر اتصفح فيه، سهل التنقل، الايباد ينشال معاك في كل مكان،

Table 22 Example of deductive analysis

Deductive Analysis	
Themes (step 1)	Codes (step 2)
Usefulness	لانه في كل شي ومفيد، كل شي فيه ، يسهل اشياء كثيرة، اسوي الواجبات عليه، الدروس تكون معايا، الايباد حق دراسة اكثر، سهولة وصول المعلومة ،جداولنا وكل شي عليه ، الايباد خليته تعليمي، مفيد في التعليم المزدوج، في الفصل المقلوب، في التعليم عن بعد، مافي شي يشغلني في نفس الايباد، حيفيدنا، معد فيه اوراق وكتابة، أوضح واسرع، يختصر المعلومة اكثر، ابحث باي لغة، مايحتاج نطبع اوراق ونشيليها، ادا مامداني اطبع اذاكر من التابليت، استخدمه للبحث عن معلومة، اصور السبورة بعدين اشوفها ادا مامداني، في وقت الفراغ اسوي ريبورت، احسن من الكتب ثقيلة وغالية، في ناس مايقدروا يجو الجامعه فهدا حل ازمتهم، يخلي تعليمي افضل، ، فيه قلم وتكتبي في نفس الشاشة، ينحفظ على طول، بدل مااشيل الكتب، اذا التابليت فيه كل شي حيوفر علي كثير، هو مفيد للشخص الي بيدرس منه، في التعليم افضل من الجوال، يحفظ كل شي في مكان واحد، كل الملفات فيه بدل ماشيل على ظهري وتعب، منظم اكثر، اسهل واريح، يكون مرتب، الاجهزة صارت للدراسة ولاشياء كثيرة في حياتنا، التعليم الجوال يعملوا قروبات على الانجليش، اسرع وانظم ، صار كل شي عليه ، يعطيني مراجع اكثر، سهولة واسرع انه ابحث بدل ماروح المكتبة ، حيساعدني مرا كثير، توفر فلوس وتلاقي ملخصات في النت بدل ماتشتريها، يمديني اتواصل مع الناس بدون مااتعرف عليه، يعطيني جرأة اكثر ، اسرع واسهل بدل ماتطبعي ورق، اريح كل شي معاك في جهاز واحد، حاكون منظمة اكثر، كل شي حيكون محفوظ في مكان واحد ، يفتحوا مقاطع يوتيوب يفهموا منها وبعدها يتناقلوها بينهم، لو اتفرجت فيديوهات يساعدني افهم المادة اكثر، مافيه واتس، يساعد في التعليم اكثر ، فكرة استخدام التابليت في التعليم حتكون مفيدة، ادا ماطبعت السلايدات اخد الايباد معايا عشان اتابع مع الاستاذة، يسهل اشياء كثيرة، لو في وقت المحاضرة مافهمت شي والدكتورة ماشرحته، أعمل بحث بسيط ويساعد، بس في اسباب لكل شخص الي ماقدرت تطبع، الي تبا تبحث عن كلمة اومعلومة في نفس وقت المحاضرة،

مافي شي يشغلني في نفس الايباد، وادا طفت اليطاريه استخدم الايباد، حيكون حلو كثير ادا الوحدة تبحث وكدا، في مواقع تعليمية لنفس المادة بالدات للمركبات ، ممكن يستفيدوا من الترجمه، يطوروا نفسهم في حاجة، اقدر احفظ معلومة عن طريق الجهاز وارجع اذاكرها بعدين، احسن من الكتاب وممكن الكتاب مايكون متوفر، نشيل الجهاز بدل مانشيل كتب، كل شي صار في التابليت، اسهل ويساعد كمان، وماسال اشخاص واستنا ايام طويلة، لجوال مايخلي تعليم احسن، لانه نكمل شغلنا عليها، كويس ادا كان بحث لي، ، فاذاكر على طول منه ، اسوي الواجبات عليه، تتغير شخصية الطالبه، لمن تتواصل بالنت تكون عندها الجرأة، خصوصا في الترجمة، ماصرت اطبع كثير، الورق صار قليل في البيت، احب اسمع ماحب اقرا ، انا حركية، لاني احب الالوان، نا ارسم بالتابليت بالقلم، تستخدمي كامل حواسك بيه، سمعي ومرئي وفيديو فيه كم طريقة، لو اتفرجت فيديوهات يساعدني افهم المادة اكثر مو مرة عل الجهاز واسيب الكتاب، الخلط بين الاثنين، يستخدموه الي مايقدروا يوصل الجامعة، في ناس مايقدروا يجو الجامعه فهدا حل ازمتهم، اشوف السلايدات قبل المحاضرة، لمن يكون عن بعد مو احسن لازم تحضري بنفسك، حلو لو كان التعليم مزدوج لانه حيقوي التواصل، حيكون مو بس تسمعي للاستاذة نفسها انت بنفسك حتبحثي اكثر، حيكون مفتوح التعليم اكثر، التعليم عن بعد اداكر من البلاك بورد عشان كدا استخدم التكنولوجيا، التابليت يكون موجود بس لاغني عن الكتاب، يعني تعليم مزدوج، نشتغل في البيت وناخده معانا الجامعة، التعليم يكون مختلط افضل، احسه يوفر وقت، حيوفرلي وقتي، ياخد وقت ادا اتفرجت في فيديوهات غير تعليمية، يضيعوا وقت، يوفر وقت بدل مااطبع اوراق، بيلخص ويختصر الوقت، بس ممكن في تنظيم الوقت	
اقعد على الجوال لو طفشت، ممكن استمتع بيه، تسلية، استمتع باني اشوف بعض الرسومات، حاستمتع اكثر، نغير من الورق والكتابة، استمتع اكثر، حيخليني استمتع لانه اسهل، حياثر على متعتي سواء ايجابي او سلبي، استمتاع انه اشيل محاضراتي معايا في الجهاز واشيله معايا في كل مكان، ياثر على متعتي ايجابيا، هو على العموم التكنولوجيا تكون ممتعه لمن تدخل في التعليم، استمتع اكثر، ممكن استمتع، تغيير بدل الكتب، فيه متعه لمن استخدمه، استمتع باني اشوف بعض الرسومات ، يستمتع اكثر لانه غير عن الكتاب شوية ، حننيسط اكثر لعب بالتعليم،	**Enjoyment**

Step Five: defining and naming the themes

All deductive and inductive themes are included in a mind map. Figure 12 is the phase one interviews mind map. Figure 17 is the phase three interviews mind map. All the themes have been defined in the result sections of both phases.

Step six: writing the report

Please refer to the result sections of phase one and phase three in this study (chapters 4, 6).

Appendix D: Quantitative Data Collection Instruments

D.1 Reflections On The Initial Questionnaire

Results and Analysis

Before publishing the questionnaire, I first consulted an expert in questionnaire design and another in TAM. The two main pieces of advice were not to repeat questionnaire items and to reduce their number. As the original questionnaire contained 140 items in total, duplicates were eliminated and the overall number was reduced to 75 items.

The questionnaire was then piloted with two student participants from the main sample, who commented that the questionnaire took a long time to complete. When asked if they would be more likely to complete it if there was a reward involved, one replied that she would still be inclined to fill out the answers as quickly as possible without reading the questions properly. Because of this, the items were further reduced from 75 to 50 questions, which required answers on a Likert scale.

Data Screening

213 participants filled in the initial questionnaire.

Since the choice 'not applicable' ('N/A') did not have a score when the data was downloaded, I had to check all of questionnaires to find out if 'N/A' was chosen or whether it was simply missing, and then a score of 9 was assigned to each of the 'N/A' responses.

Missing data for case screening:

To count the missing data for each case, the formula *count blank* was used in order to ascertain the number of valid responses. Seven participants had more than 20% of items missing and so their questionnaires were removed from the data.

Unengaged respondents:

By counting the standard deviation for the latent variables on the spreadsheet, it was shown that nine participants were not completely engaged in the responses, with SD=0.000. They responded either all agree or all strongly agree for all the latent variables, and so their questionnaires were removed. For a score of under 0.400, it was necessary to check the items,

especially items 10 (which refers to BI4) and 45 (which refers to ATT3), since these are different to the others. Thus, if the SD was below 0.400 and one of these two items had the same answer as the rest, this case was removed in order to increase the reliability. Accordingly, three participants were removed and as a result, 194 valid questionnaires remained out of 213.

Missing data for variable screening:

28 of the variables had missing data. However, each of these variables had no more than two missing values and so they were replaced by the median.

Kurtosis means that there are no lots of variance in the variable been kurtood. There are 28 variables ranging between 2 and -2 kurtosis. For example, item 4 (ease of use) has a value of 6.12 kurtosis, meaning that many participants have the same answer.

	ES4	AUSAGE2	US6	M1	AUSAGE4	ES5	M3	M4	ES3	US7	ES2	M2
Kurtosis	6.12	2.71	2.74	2.98	4.42	3.13	3.41	4.55	5.39	2.47	2.69	3.05

Exploratory factor analysis (EFA)

Carrying out the EFA in SPSS did not work at all. By using the principle components for extraction and Varimax rotation, the results show that the table variance has extracted nine factors with about 61% explained by the variance of the factors. However, the scree plot shows that there are four factors in the model whereas the expected number was ten.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	11.513	31.117	31.117	11.513	31.117	31.117	7.190	19.432	19.432
2	2.495	6.743	37.861	2.495	6.743	37.861	3.210	8.676	28.108
3	1.894	5.119	42.980	1.894	5.119	42.980	2.087	5.640	33.747
4	1.443	3.900	46.880	1.443	3.900	46.880	2.033	5.495	39.242
5	1.258	3.399	50.279	1.258	3.399	50.279	2.024	5.469	44.711
6	1.210	3.270	53.549	1.210	3.270	53.549	1.867	5.047	49.758
7	1.102	2.979	56.528	1.102	2.979	56.528	1.655	4.472	54.231
8	1.018	2.751	59.279	1.018	2.751	59.279	1.522	4.113	58.344
9	1.002	2.707	61.986	1.002	2.707	61.986	1.347	3.642	61.986
10	.975	2.636	64.621						
11	.896	2.422	67.043						
12	.853	2.305	69.348						
13	.812	2.195	71.543						
14	.771	2.083	73.627						
15	.714	1.930	75.557						
16	.702	1.896	77.453						

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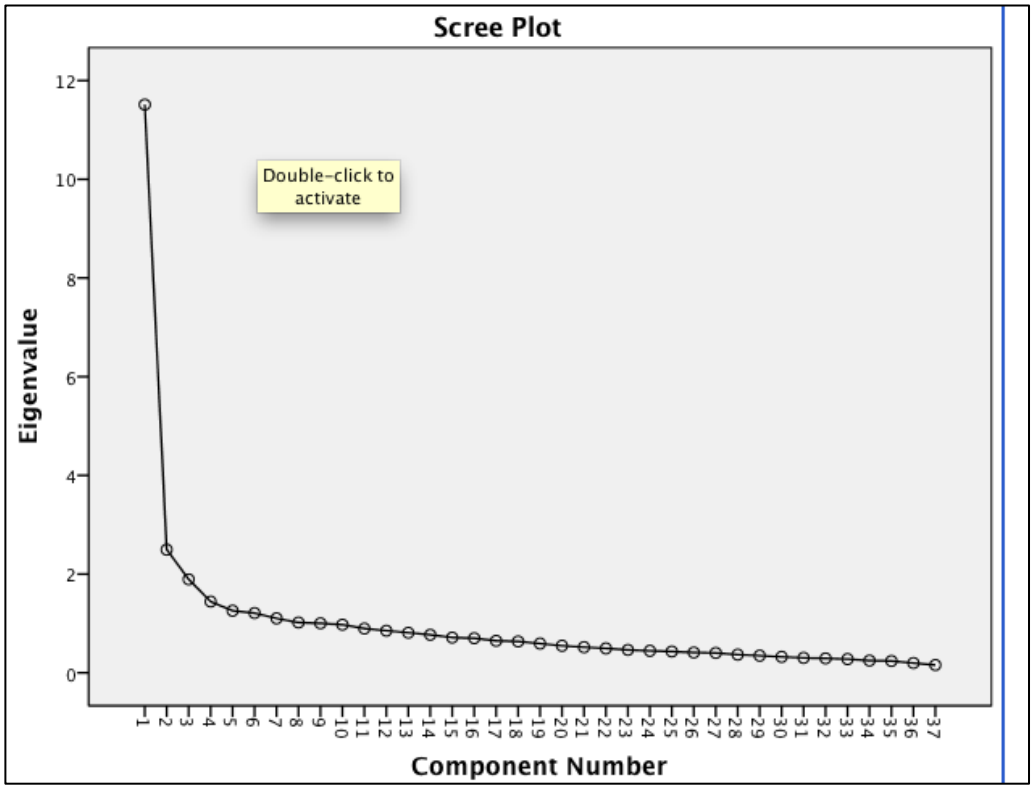

From the table below it can be seen that the first construct includes items for achievement, usefulness, willingness, self-efficacy and enjoyment, which all have different meanings. This indicates that something is wrong in the data.

Rotated Component Matrix[a]

	Component								
	1	2	3	4	5	6	7	8	9
ACH4	.774								
W3	.737								
US3	.735								
W1	.719								
EJ4	.669						.355		
W2	.657								
US2	.622								
CF3	.606			.544					
EJ3	.605								
US4	.603								
US5	.592								-.339
ACH1	.562								
ACH2	.471					.434			.312
CF1	.469					.355			
US6	.403	.360	.310			.311			
ES3		.746							
M3		.687							
M4		.669							
M2		.579						.355	
US7	.354	.567					.387		
ES5		.440					.326		
ES1			.817						
ES4			.669						
ES2	.348	.332	.478					.371	
M1		.352	.353						
IDS3				.680					
IDS2				.580		.535			
IDS1	.378			.399				.310	.324
EJ1	.368			.396		.301	.301		
W5					.778				
W4	.357				.713				
ACH3	.354					.677			

After dropping some items that load on two constructs with the loading no more than 2, this did not work either. There was still the same issue of items with different meanings being in the same construct. According to Kline (1994), “if the analyses yielded one factor with items that seem dissimilar, it probably is best not to take the factor too seriously as an indicator of a latent variable”. Although the Cronbach’s alpha for each of the factors was tested and the items deleted accordingly to achieve higher reliability, this did not work either. The cases with the "not applicable" option had been excluded and the factor analysis had been run, but unfortunately it did not work.

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Reasons for the EFA not working:

The reasons why the initial questionnaire EFA analysis did not work and led to factors of loading were as follows:

1. The 4-point scale. Most of the TAM questionnaire models and studies used a 7-point Likert scale.
2. The 'not applicable' option. This initial questionnaire has a 4-point Likert scale and a 'not applicable' option.
3. The wording of the questionnaire items. For example, some of the items relate to tablets in general and some relate specifically to tablet use for learning. The factors and items of the initial questionnaire are derived from students' interview responses. "Sometimes inclusion of a specific phrase can create a false appearance of a conceptually meaningful factor. When some statements are worded in the first person and others are not, for example, they may account for the pattern of association observed" (Kline, 1994).
4. The timing, in that the students were on vacation.
5. iSurvey did not support Arabic language in its orientation. The reason for not using isurvey in the main questionnaire is that to the best of my knowledge it does not support the Arabic language in its right to left direction. I have asked the isurvey team, IT help in Hartley, and Saudi students in computer science, but none of them knew. I tried using the options and codes but this did not work.
6. Some of the university email addresses did not belong to students anymore.

Confirmatory factor analysis:

This step has not been employed as the EFA for the questionnaire did not run correctly.

The Initial Questionnaire in English

1. *For how long have you used a tablet?*

1. Never
2. Less than 3 years
3. More than 3 years

2. *What is your discipline?*

1. Social Science 2. Natural Science

3. *Where can you have access to the Internet?*

1. Home 2. University 3. Both

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

1. I have skill in using tablet.
2. I know about tablet and its use.
3. Overall, how do you feel about tablet features?

5. *To what extent the next statements are important to you (3=very important, 2=important, 1=not important)*

1. I think the university needs to provide me with tablet resources.
2. I think the teacher needs to encourage and support me to use tablet.

6. *To what extent do you agree to the following statements (4=strongly agree, 3=agree, 2=disagree, 1= strongly disagree, 9=not applicable)*

No	Item	Construct
1	I tend to use a tablet in learning.	Willingness
2	I am eager to use a tablet in my learning.	
3	I am very interested in using a tablet in my learning.	
4	I will work hard to use a tablet in my studies even if I do not like it.	

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5	Even if I find learning with a tablet to be dull, I will continue to use it in my learning.	
6	I feel confident about using a tablet in my learning.	Self-efficacy
7	I am confident about using a tablet for anything I need.	
8	I feel confident about using a tablet in the classroom.	
9	Using a tablet to study is a good idea.	Attitude
10	I like using a tablet in a classroom where there are regulations about its use.	
11	I am not convinced about using a tablet in my learning.	
12	I feel positive about using a tablet in my learning.	
13	I like using a tablet to learn.	
14	Interacting with a tablet does not require a lot of mental effort.	Ease of use
15	I find a tablet easy to use.	
16	It is easy to find information on a tablet.	
17	Learning how to use a tablet is easy for me.	
18	The tablet is easy to carry and look after.	
19	I can use a tablet wherever I am.	Mobility
20	I can use a tablet whenever I need to.	
21	I can use a tablet to search for any kind of information by any language.	
22	Students who are unable to travel to the university can study at home using a tablet.	
23	Using a tablet can increase my chances of getting a good grade.	Achievement
24	Using a tablet can improve my learning performance.	
25	Using a tablet in my learning can increase my academic productivity.	
26	I can achieve more by using a tablet in my learning.	
27	I have fun using a tablet.	Enjoyment

28	Using a tablet is more entertaining.	
29	It feels more enjoyable to use a tablet in learning than pen and paper.	
30	A tablet makes my learning more interesting.	
31	Using a tablet for learning is useful for the environment.	Usefulness
32	Using a tablet enables me to accomplish tasks more quickly.	
33	Using a tablet in my learning helps me to be organised.	
34	Using a tablet in my learning can save time.	
35	I find a tablet useful in the classroom.	
36	Using a tablet fits in with any learning design for example, online, distance, blended, flipped classroom.	
37	Using a tablet fits in with learning styles auditory, visual and kinaesthetic.	
38	I believe that if I don't use a tablet, I will be considered old fashioned.	Identity
39	I believe that tablets belong to our generation.	
40	I use a tablet to have a better reputation between my friends.	
41	Using a tablet can change student's personality.	
42	I will have more prestige if I use a tablet.	
43	I intend to use a tablet in the way the university asks.	Intention
44	I plan to use a tablet only if the university improves their learning management online systems.	
45	I intend to use a tablet frequently in learning.	
46	I predict that I will not use a tablet in my learning in the future.	
47	I use a tablet for learning.	Actual usage
48	I use ready-made applications on tablet to watch learning videos, access blackboards, browse the internet, translate **or** download and view learning slides.	

49	I use a tablet to input data for example, writing notes in class, writing assignments, making presentation, recording lectures or experiments if I have permission.	
50	I use a tablet to communicate with my friends and teachers via email or any other way.	

Appendix D

The Initial Questionnaire in Arabic

١. منذ متى وأنت تستخدمي الجهاز اللوحي؟

أكثر من ٥ سنوات

أقل من ٥ سنوات

أبدا

٢. ما هو تخصصك الدراسي؟

العلوم الاجتماعية (أدبي)

العلوم الطبيعية (علمي)

٣. أين يمكنك الوصول إلى الإنترنت؟

في الجامعة

في المنزل

كلاهما

٤. أوصفي مدى قوة العبارات التالية: (٣=قوية، ٢=متوسطة، ١=ضعيفة)

لدي **مهارة** في استخدام الجهاز اللوحي

لدي المعرفة عن الجهاز اللوحي وطريقة استخدامه..

بصفة عامة، ماهو شعورك حول خصائص الجهاز اللوحي؟

٥.. مامدى أهمية العبارات التالية بالنسبة لك: (٣= مهمة جدا، ٢=مهمة، ١=غير مهمة)

أعتقد أنه على الجامعة توفير موارد الجهاز اللوحي

على أعضاء هيئة التدريس القيام بدعمي وتشجيعي لاستخدام الجهاز اللوحي..

٦. مامدى موافقتك على العبارات التالية: (٤=موافق بشدة ٣= موافق، ٢=غير موافق، ١=غير موافق بشدة، ٩= لاينطبق علي)

١. التفاعل مع الجهاز اللوحي لا يتطلب الكثير من الجهد الذهني.
٢. أجد الجهاز اللوحي سهل الاستخدام.
٣. من السهل الحصول على المعلومات باستخدام الجهاز اللوحي.

٤. تعلم كيفية استخدام الجهاز اللوحي سهل بالنسبة لي.

٥. من السهل حمل الجهاز اللوحي والاعتناء به.

٦. استخدام الجهاز اللوحي مفيد للبيئة. (التوقف عن هدر الاوراق).

٧. استخدام الجهاز اللوحي يمكنني من إنجاز المهام بسرعة أكبر.

٨. استخدام الجهاز اللوحي في تعليمي يساعدني لأكون منظمة أكثر.

٩. استخدام الجهاز اللوحي في تعليمي يوفر لي الوقت.

١٠. أجد الجهاز اللوحي مفيد داخل الفصول الدراسية.

١١. استخدام الجهاز اللوحي يتناسب مع أي طرق تعليم كالتعليم عن بعد، التعليم المخلوط/المزدوج، التعليم المفتوح.

١٢. استخدام الجهاز اللوحي يتناسب مع أساليب التعلم السمعية والبصرية والطبيعية

١٣. استخدام الجهاز اللوحي يزيد فرصي في الحصول على درجات عالية.

١٤. استخدام الجهاز اللوحي ممكن يحسن من أداء تعليمي.

١٥. استخدام الجهاز اللوحي في التعلم ممكن يرفع من مستواي الأكاديمي.

١٦. يمكنني تحقيق المزيد باستخدام الجهاز اللوحي في التعلم.

١٧. أشعر بالثقة حول استخدام الجهاز اللوحي في تعليمي.

١٨. أنا واثقة من استخدام الجهاز اللوحي لأي شيء أحتاجه.

١٩. أشعر بالثقة حول استخدام الجهاز اللوحي داخل الفصول الدراسية.

٢٠. أشعر بالمتعة وأنا استخدم الجهاز اللوحي.

٢١. استخدام الجهاز اللوحي يعتبرأكثر تسلية.

٢٢. أشعر بالاستمتاع في استخدام الجهاز اللوحي أكثر من الورق والقلم.

٢٣. الجهاز اللوحي يجعل تعليمي أكثر إثارة.

٢٤. استخدام الجهاز اللوحي للدراسة فكرة جيدة.

٢٥. أنا أحب استخدام الجهاز اللوحي في الفصل الدراسي عندما تكون هناك ضوابط لاستخدامه.

٢٦. أنا غير مقتنعة باستخدام الجهاز اللوحي في التعلم.

٢٧. أشعر بإيجابية حول استخدام الجهاز اللوحي في التعلم.

٢٨. أنا أحب استخدام الجهاز اللوحي للتعلم.

٢٩. أنوي استخدام الجهاز اللوحي بالطريقة التي تطلبها مني الجامعة.

٣٠. أخطط لاستخدام الجهاز اللوحي فقط إذا طورت الجامعة أنظمتها للتعليم الالكتروني على الانترنت.

٣١. أنوي استخدام الجهاز اللوحي بشكل مستمر في التعلم.

٣٢. أتوقع أنني لن أستخدم الجهاز اللوحي في التعلم في المستقبل.

٣٣. أنا أميل إلى استخدام الجهاز اللوحي في تعلمي.

٣٤. أنا متشوقة لاستخدام الجهاز اللوحي في تعلمي

٣٥. أنا مهتمة جدا في استخدام الجهاز اللوحي في تعلمي.

٣٦. سأعمل جاهدة لأستخدم الجهاز اللوحي في دراستي حتى لو كنت لا أرغب في ذلك.

٣٧. حتى إذا وجدت التعلم بالجهاز اللوحي ممل، سوف أستمر لاستخدامه في التعلم.

٣٨. يمكنني استخدام الجهاز اللوحي أينما أكون.

٣٩. يمكنني استخدام الجهاز اللوحي وقت ماأحتاجه.

٤٠. يمكنني استخدام الجهاز اللوحي للبحث عن أي نوع من المعلومات بأي لغة.

٤١. الطلاب الغير القادرين على الذهاب إلى الجامعة، بإمكانهم الدراسة من البيت باستخدام الجهاز اللوحي.

٤٢. أستخدم الجهاز اللوحي في التعلم.

٤٣. أستخدم التطبيقات/البرامج الجاهزة على الجهاز اللوحي لأشاهد الفيديوهات التعليمية أو أدخل على البلاكبورد أو أبحث في الانترنت، أوأترجم أوأحمل شرائح عروض المحاضرات.

٤٤. أستخدم الجهاز اللوحي لإدخال بينات ككتابة الملاحظات، كتابة البحوث العلمية، أو عمل عروض، أو تسجيل المحاضرات أو التجارب إذا كان لدي إذن.

٤٥. أستخدم الجهاز اللوحي للتواصل مع الأصدقاء والمعلمات عبر الايميل او أي وسيلة أخرى.

٤٦. أستخدم الجهاز اللوحي ليكون لدي سمعة أفضل

٤٧. استخدام الجهاز اللوحي ممكن أن يغير من شخصية الطالبة.

٤٨. أعتقد أنه إذا كنت لا أستخدم الجهاز اللوحي، سيعتبروني من الطراز القديم.

٤٩. أعتقد أن الجهاز اللوحي ينتمي إلى جيلنا الحالي.

٥٠. سيكون لدي هيبة أكثر إذا كنت أستخدم الجهاز اللوحي.

.

Appendix D

D.2 Main Questionnaire in English

Q1. Are you a female undergraduate student at King AbdulAziz University?

1. Yes

2. No (Move to the end>> thank them)

Q2. Which Discipline are you in

1. Natural Science
2. Social Science

Q3. Do you use any kind of mobile technology device for learning?

1. Yes
2. No (Move to Q8,9,10)

Q4. How long have you used /(been using) tablet for learning?

1. Less than 3 years
2. More than 3 years

Q5. Give your opinion about the following statements (3=strong, 2=fair, 1=poor)

1. Access to the internet at the university
2. The features of the tablet when using it for learning
3. The university's support of the use of tablet for learning
4. The teacher's support you to learn using a tablet
5. Your skill in using tablet for learning
6. Your knowledge about tablet use for learning

Q6. To what extent do you agree to the following statements? (7=strongly agree, 6=moderately agree, 5=agree, 4=neutral, 3=disagree, 2=moderately disagree, 1=strongly disagree)

No.	Item	Construct	References
1	Learning how to use a tablet is easy for me.	Ease of use	

2	Interacting with a tablet does not require a lot of mental effort.		(Venkatesh et al., 2003)
3	Overall, I find the tablet easy to use.		
4	It is easy for me to use the tablet to do what I want to do.		
5	I find using a tablet for learning to be entertaining.	Enjoyment	(Venkatesh & Bala, 2008)
6	I enjoy when I learn with a tablet.		
7	I have fun using a tablet for learning.		
8	When I using a tablet for learning, I feel pleasure.		
9	I am willing to use a tablet to learn with.	Willingness	Self-developed
10	I tend to use a tablet to learn with.		
11	I am interested to use a tablet to learn with.		
12	I am eager to use a tablet for learning.		
13	I am self-confident about using a tablet for learning.	Self efficacy	(Park, 2009)
14	I am able to use a tablet for learning.		Self-developed
15	I can use a tablet for learning without any assistance.		
16	I believe that I can use tablet for learning.		
17	Using a tablet for learning enhances my effectiveness of learning.	Usefulness	(Venkatesh et al., 2003)
18	Using a tablet for learning enables me accomplish tasks more quickly.		
19	Using a tablet for learning increases my academic productivity.		

20	Using a tablet for learning improves my academic performance.		
21	My friends at the university who use tablets for learning have more prestige than those who do not.	image	(Venkatesh & Bala, 2008)
22	My friends at the university who use tablets for learning have a high profile.		
23	Having a tablet to learn with is a status symbol at my university.		
24	My friends at the university who use tablets for learning are considered modern.		
25	It is convenient to access a tablet to learn anywhere at any time.	Mobility	(Ally & Gardiner, 2012) + Self Developed
26	The mobility of a tablet makes it possible to learn with.		
27	Mobility of a tablet is an outstanding advantage of a tablet to learn with.		
28	One of the reasons encourages me to learn with a tablet is its mobility “anywhere anytime”.		
29	I have better grades when using tablet for learning.	Achievement	Self-developed
30	I increase my chances of getting good grades by using tablet for learning.		
31	I have better academic results when using tablet for learning purposes.		
32	Overall, using a tablet to learn is a wise decision.	Attitude	(Park, 2009; Venkatesh et al., 2003)
33	I consider the decision of using tablet for learning is a positive one.		

34	Overall, using a tablet to learn is a good idea.		
35	I like the idea of using tablet for learning.		
36	I intend to use the tablet for learning in the future.	Behavioural intention	(Venkatesh et al., 2003)
37	I predict I will use the tablet for learning in the future.		
38	I plan to use the tablet for learning in the future.		

Q7. On the average, how frequently do you use tablet for learning? Reference: (Abdulwahab & Zulkhairi, 2012)

Always 7	Very regularly 6	Often 5	Sometimes 4	Rarely 3	Very rarely 2	Never 1

Q8. Why do not you use a mobile device for learning? (difficult, boring, expensive, common, ..etc)

Q9. Do you have a positive attitude to using a tablet for learning?

Yes. Why?

No. Why?

Q10. Do you intend to use a tablet for learning?

Yes. How?

No. Why?

List of References of the Questionnaire

Appendix D

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D.3 Main Questionnaire in Arabic

استبيان

س١. هل أنت طالبة بكالوريوس حاليا في جامعة الملك عبدالعزيز؟

نعم

لا (انهاء الاستبيان)

س٢. ماهو تخصصك الحالي:

١. علمي
٢. أدبي

س٣. هل تستخدمين أي نوع من أجهزة الجوال "كالأجهزة اللوحية، الجوال الذكي، لابتوب" في تعلمك؟

نعم

لا (الانتقال الى السؤال ٨,٩,١٠)

س٤. مامدى خبرتك في استخدام الأجهزة اللوحية في التعلم؟

أكثر من ٣ سنوات

أقل من ٣ سنوات

س٥. أوصفي مدى قوة (جودة) العبارات التالية: (٣=قوية، ٢=متوسطة، ١=ضعيفة)

١. حرية الوصول الى الانترنت في الجامعة
٢. مميزات الجهاز اللوحي عند استخدامه للتعلم
٣. دعم الجامعة لك لاستخدام الجهاز اللوحي في التعليم
٤. دعم المعلمة لك لاستخدام الجهاز اللوحي في التعليم
٥. مهاراتك في استخدام الجهاز اللوحي في التعليم
٦. معرفتك عن استخدام الجهاز اللوحي في التعليم

س٦: إلى أي مدى تتفقين فيه مع العبارات التالية التالية: (٧=موافق بشدة، ٦=موافق إلي حد ما،٥= موافق، ٤=حيادي، ٣=غير موافق،٢=غير موافق إلي حد ما، ١=غير موافق بشدة):

Appendix D

الرقم	العبارة
١	تعلم كيفية استعمال الجهاز اللوحي سهل بالنسبة لي.
٢	التفاعل مع الجهاز اللوحي لايتطلب مني الكثير من الجهد الذهني.
٣	بصفة عامة، أجد الجهاز اللوحي سهل الاستخدام.
٤	من السهل بالنسبة لي استخدام الجهاز اللوحي لعمل أي شي أريده.
٥	أجد استخدام الجهاز اللوحي في التعلم مسليا.
٦	أستمتع باستخدام الجهاز اللوحي في التعلم.
٧	أشعر بالمرح عند استخدام الجهاز اللوحي في التعلم.
٨	أشعر بالسرور عندما أتعلم باستخدام الجهاز اللوحي.
٩	أرغب في استخدام الجهاز اللوحي في التعلم.
١٠	أميل لفكرة استخدام الجهاز اللوحي في التعلم.
١١	أنا متحمسة لاستخدام الجهاز اللوحي في التعلم.
١٢	أنا متشوقة لكي أاتعلم باستخدام الجهاز اللوحي.
١٣	أشعر بالثقة عند استخدام الجهاز اللوحي في التعلم.
١٤	أستطيع استخدام الجهاز اللوحي في التعلم.
١٥	بإمكاني أن أستخدم الجهاز اللوحي في التعلم بدون أي مساعدة.
١٦	استخدام الجهاز اللوحي في التعلم يعزز من فاعلية التعليم.
١٧	استخدام الجهاز اللوحي في التعلم يمكنني من إنجاز مهامي بسرعة أكبر.
١٨	استخدام الجهاز اللوحي في التعلم يزيد من إنتاجي الأكاديمي.
١٩	استخدام الجهاز اللوحي في التعلم يطور من أدائي الأكاديمي.
٢٠	صديقاتي في الجامعة اللاتي يستعملن الأجهزة اللوحية في التعلم لديهن هيبة (بريستيج) أعلى من اللواتي لايستخدمونه.
٢١	صديقاتي في الجامعة اللاتي يستعملن الأجهزة اللوحية في التعلم لديهم سمعة أكبر.
٢٢	امتلاكي لجهاز لوحي واستخدامه في التعلم هو رمز للمكانة بين صديقاتي في جامعتي.
٢٣	صديقاتي في الجامعة اللاتي يستعملن الأجهزة اللوحية في التعلم يعتبرن أكثر تحضرا.

٢٤	من المناسب أن التعلم باستخدام الجهاز اللوحي يكون في أي مكان وأي زمان.
٢٥	ميزة التنقل بالجهاز اللوحي جعلت من الممكن التعلم به.
٢٦	يعتبر التنقل بالجهاز اللوحي ميزة فريدة له للتعلم به.
٢٧	من أهم الأسباب التي تشجعني على التعلم باستخدام الجهاز اللوحي هو ميزة تنقله "أي مكان وأي زمان".
٢٨	يساعدني استخدام الجهاز اللوحي في التعلم من رفع درجاتي.
٢٩	يزيد استخدام الجهاز اللوحي في التعلم من فرص حصولي على درجات جيدة.
٣٠	يساعدني استخدام الجهاز اللوحي في الأغراض التعليمية للحصول على نتائج أكاديمية أفضل.
٣١	بصفة عامة، يعتبر استخدام الجهاز اللوحي في التعلم قرار سليم.
٣٢	بصفة عامة، يعتبر استخدام الجهاز اللوحي في التعلم قرار إيجابي.
٣٣	بصفة عامة، يعتبر استخدام الجهاز اللوحي في التعلم قرار جيد.
٣٤	أنوي باستخدام الجهاز اللوحي في التعلم في المستقبل.
٣٥	أتوقع بأنني سوف أستخدم الجهاز اللوحي في التعلم في المستقبل.
٣٦	أخطط لاستخدام الجهاز اللوحي في التعلم في المستقبل.

س٧. مامدى استخدامك للجهاز اللوحي في التعلم؟

دائما	بصفة منتظمة	غالبا	في بعض الأوقات	نادرا	نادرا جدا	أبدا
٧	٦	٥	٤	٣	2	1

س٨. هل من الممكن أن تذكري سبب عدم استخدامك لأي نوع من أجهزة الجوال المتنقلة في تعلمك؟ (صعب، غالي، بطيئ، ممل.....الخ).

س٩. هل تؤيدين استخدام الجهاز اللوحي في التعلم؟ (مفيد، له أضرار، مسلي، ممل، سمعتي بين صاحباتي، سهل،صعب، رغبة، قدرة، مهارة، خبرة، معرفة، مميزات الجهاز، الجامعة.....الخ)

نعم لماذا؟

لا لماذا؟

س١٠. هل تستخدمين أو تنوين استخدام الجهاز اللوحي في التعلم؟

نعم. كيف ستستخدمينه في التعلم؟.

لا.لماذا؟.

D.4 The Refinement Questionnaire

Q1. Give your opinion about the following statements (3=strong, 2=fair, 1=poor)

1. Access to the internet at the university.

2. The teacher's support you to learn using a tablet.

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

No.	Item	Construct
1	Learning how to use a tablet is easy for me.	Perceived enablers
2	Overall, I find the tablet easy to use.	
3	It is easy for me to use the tablet to do what I want to do.	
4	I am able to use a tablet for learning.	
5	I believe that I can use tablet for learning.	
6	The mobility of a tablet makes it possible to learn with.	
7	Mobility of a tablet is an outstanding advantage of a tablet to learn with.	
8	I find using a tablet for learning to be entertaining.	Perceived enjoyment
9	I have fun using a tablet for learning.	
10	My friends at the university who use tablets for learning have more prestige than those who do not.	Perceived image
11	My friends at the university who use tablets for learning have a high profile.	
12	Having a tablet to learn with is a status symbol at my university.	
13	My friends at the university who use tablets for learning are considered modern.	

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14	I have better grades when using tablet for learning.	Perceived value
15	I increase my chances of getting good grades by using tablet for learning.	
16	I have better academic results when using tablet for learning purposes.	
17	Using a tablet for learning improves my academic performance.	
18	I intend to use the tablet for learning in the future.	Behavioural intention
19	I predict I will use the tablet for learning in the future.	
20	I plan to use the tablet for learning in the future.	

Appendix E: Factor Analysis Tables

Table 23 The definitions of the concepts used in factor analysis

Concept	Definition	Reference
correlation coefficient	a numerical measure of the degree of agreement between two sets of scores. It runs from +1 to -1: +1 indicates full agreement, 0 no relationship, and -1 complete disagreement.	(Kline, 1994:3)
correlation matrix	a set of correlation coefficients between a number of variables	(Kline, 1994:4)
factor	a dimension or construct which is a condensed statement of the relationships between a set of variables/indicators	(Kline, 1994:5)
factor loadings	the correlations of a variable with a factor	(Kline, 1994:5)
mean	the average score of any group on a test	(Kline, 1994:15)
standard deviation	a measure of dispersion or variation among scores	(Kline, 1994:16)
standard or z score	an important means of transforming scores which enter into many aspects of factor and correlational analysis	(Kline, 1994:16)
variance	the average of the squared standard deviation.	(Kline, 1994:17)

Appendix E

Table 24 The first result output for EFA for all the items and constructs

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.967
Bartlett's Test of Sphericity	Approx. Chi-Square	9350.834
	df	703
	Sig.	.000

Rotated Component Matrix[a]

	Component			
	1	2	3	4
BI1	.798	.278		
W2	.794	.247		
W1	.786	.328		
BI2	.783	.256		
BI3	.782	.231		
W4	.781	.278	.201	
Att1	.777	.269	.260	
W3	.753	.286	.245	
Att2	.746	.283	.263	
Att4	.709	.296	.306	
Att3	.706	.282	.267	
EJ2	.686	.312	.271	
EJ4	.637	.296	.312	
Us1	.614	.315	.338	
EJ1	.614	.340	.256	
Us2	.607	.329	.334	

Us3	.553	.208	.544	
Mb1	.531	.461		
Cf1	.516	.287	.275	.386
EJ3	.516	.347	.274	.214
ES3	.291	.786		
ES1	.233	.765		
Cf4	.422	.698		
ES4	.248	.669	.231	
Cf3		.662	.230	
Cf2	.421	.642		
Mb2	.451	.632		
Mb4	.519	.545		
Mb3	.455	.537		
ES2	.234	.484	.259	
Ach1	.320		.775	
Ach3	.300	.245	.750	
Ach2	.371	.210	.681	.256
Us4	.462	.264	.646	
Img2				.832
Img1				.831
Img3				.798
Img4				.788

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 6 iterations.

Appendix E

Table 25 The rotated component matrix including Cronbach's Alpha

Rotated Component Matrix

	Component				
	1	2	3	4	5
Alpha	**.898**	**.887**	**.857**	**.887**	**.785**
ES1	**.791**	.117	.038	.029	.273
ES3	**.790**	.161	-.030	.114	.237
Cf4	**.755**	.228	.038	.317	.080
ES4	**.734**	.252	.061	.146	.006
Cf2	**.708**	.255	.026	.348	.040
Mb2	**.690**	.115	.070	.382	.076
Mb3	**.541**	.158	.165	.270	.387
Ach1	.177	**.820**	.175	.151	.189
Ach3	.254	**.800**	.132	.156	.093
Ach2	.233	**.736**	.260	.247	.108
Us4	.273	**.719**	.163	.283	.195
Img2	.021	.172	**.849**	.065	-.053
Img1	.035	.069	**.834**	.014	.115
Img3	-.065	.176	**.798**	.106	.131
Img4	.165	.123	**.794**	.094	.063
BI3	.281	.239	.092	**.800**	.130
BI1	.351	.259	.152	**.764**	.194
BI2	.323	.279	.086	**.729**	.253
EJ3	.287	.286	.176	.233	**.762**
EJ1	.333	.290	.104	.391	**.615**

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 6 iterations.

Table 26 The description of fit indices and their criteria (Cohen et al., 2011; Hair et al., 2010; Hooper et al., 2008)

Fit Index	Criteria	Description
Chi-Square χ^2	Low χ^2 relative to degrees of freedom with an insignificant p value ($p > 0.05$)	Statistical measure of difference used to compare the observed and estimated covariance matrices.
Degree of freedom		The number of nonredundant covariances/correlations in the input matrix minus the number of estimated coefficients.
Root Mean Square Error of Approximation (RMSEA)	Values less than 0.07	It better represents how well a model fits a population, not just a sample used for estimation. It tries to correct for both model complexity and sample size by including each in its computation. Lower RMSEA values represents better fit. Cut value of 0.05 or 0.08.
Goodness of fit index (GFI)	Values greater than 0.95	Scaled between 0 and 1, with higher values representing better model fit.
Adjusted goodness of fit index (AGFI)	Values greater than 0.95	Adjusts the GFI based on the number of parameters in the model. Values can fall outside the 0-1.0 range.
Normed fit index (NFI)	Values greater than 0.95	Assesses fit relative to a baseline model which assumes no covariances between the observed variables. Has a tendency to overestimate fit in small samples.
Comparative fit index (CFI)	Values greater than 0.95	Normed, 0-1 range.

Appendix E

Table 27 Nomological validity: covariances estimates

			Estimate	S.E.	C.R.	P
image	<-->	value	.700	.118	5.936	***
intention	<-->	value	.866	.102	8.477	***
intention	<-->	enablers	.578	.068	8.541	***
value	<-->	enablers	.470	.062	7.540	***
image	<-->	enjoyment	.485	.103	4.710	***
value	<-->	enjoyment	.768	.092	8.313	***
enablers	<-->	enjoyment	.486	.060	8.150	***
image	<-->	intention	.497	.112	4.422	***
intention	<-->	enjoyment	.883	.096	9.165	***
image	<-->	enablers	.180	.064	2.788	.005

Note: Estimate = regression coefficients; S.E.= standard error; C.R.= critical ratio; P= significance value.

Table 28 Nomological validity: constructs correlations

			Estimate
image	<-->	value	.450
intention	<-->	value	.693
intention	<-->	enablers	.752
value	<-->	enablers	.630
image	<-->	enjoyment	.354
value	<-->	enjoyment	.719
enablers	<-->	enjoyment	.740
image	<-->	intention	.309
intention	<-->	enjoyment	.802
image	<-->	enablers	.188

Appendix F: The Statistical Results Of Students' Attitude And Intention Toward Using Tablets For Learning

Based on the results of students' questionnaire in the second phase, I analysed overall students' attitude and intention and compare them with those who use tablets for learning and those who do not.

Although 40 participants answered negatively that they do not use mobile devices in learning, 52% have positive attitude toward using tablets in learning, 17% are neutral, and 22% have negative attitude toward using mobile devices in learning and 7% gave no answer (Figure 24). Those who have positive attitude state that mobile devices are easier to carry than heavy bags with a lot of books, are faster than traditional books, easier, more useful and enjoyable, save time, are good for organising, increase mobility and make education better.

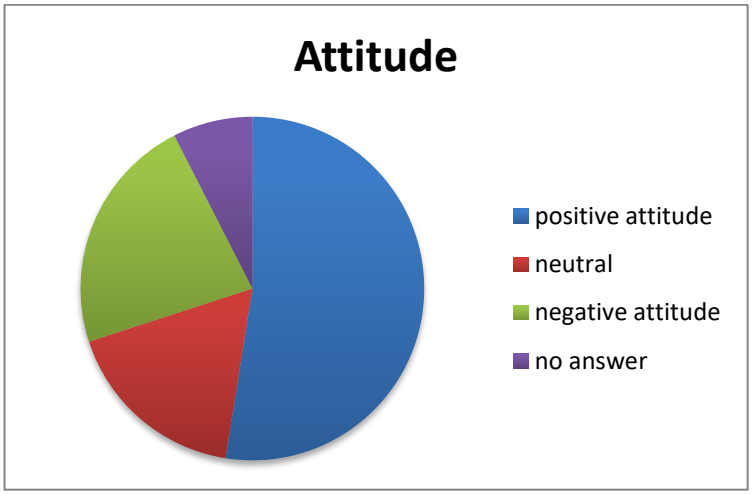

Figure 24 The result of attitude

Moreover, out of 40 participants who stated that they do not use mobile devices in learning, 45% have the intention to use a tablet in learning, 5% are neutral, while 40% do not have any intention to use a tablet for learning and 10% gave no answer (Figure 25). Those who intend to use tablets for learning will use them for downloading slides, doing assignments, sharing knowledge, using new apps, for blended learning or distance learning, recording notes, and downloading and reading e-books.

Appendix F

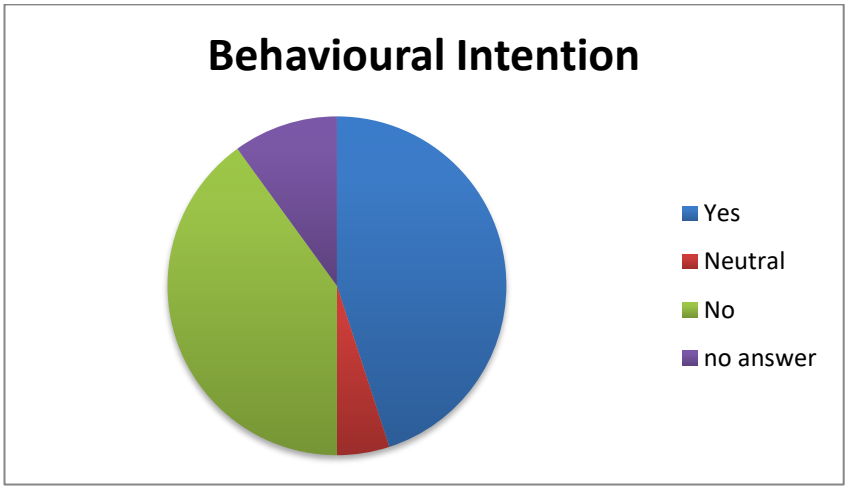

Figure 25 The result of behavioural intention

Interestingly, the results show that although more than 50% have a positive attitude, when it comes to their intention, the percentage of those who intend to use a tablet for learning is close to those who do not.

On the other hand, among those who answered that they do use mobile devices for learning, the results in Table 29 reveal that the majority of respondents have a positive attitude towards using a tablet for learning when more than 50% respondents in each item of the attitude were strongly agree indicating they have positive attitude.

Table 29 The percentage of the attitude item responses

	1	2	3	4	5	6	7
ATT1.	.7%	.7%	1.7%	8.6%	18.2%	20.1%	50.2%
ATT2.	1.3%		1.3%	6.6%	16.8%	20.5%	53.5%
ATT3.	1.0%	.3%	1.0%	5.9%	18.8%	20.1%	52.8%
ATT4.	1.3%	.7%	1.0%	7.6%	13.2%	20.8%	55.4%
Note: 1= strongly disagree; 2=moderately disagree; 3=disagree; 4=Neutral; 5=agree; 6=moderately agree; 7= strongly agree. Att1. Overall, using a tablet to learn is a wise decision. Att2. I consider the decision of using tablet for learning is a positive one. Att3. Overall, using a tablet to learn is a good idea. Att4. I like the idea of using tablet for learning.							

In addition, results in Table 30 indicate that the majority of respondents strongly intend to use a tablet for learning in the future. The results for behavioural intention show that more than 50% of the respondents strongly agree that they intend to use tablet for learning in the future.

Table 30 The percentage of the behavioural intention item responses

	1	2	3	4	5	6	7
BI1.	.7%	1.7%	2.3%	6.6%	15.8%	15.2%	57.8%
BI2.	.7%	.3%	2.0%	3.6%	17.8%	18.2%	57.4%
BI3.	1.7%	.3%	3.0%	8.3%	12.5%	20.5%	53.8%
Note: 1= strongly disagree; 2=moderately disagree; 3=disagree; 4=Neutral; 5=agree; 6=moderately agree; 7= strongly agree. BI1. I intend to use the tablet for learning in the future. BI2. I predict I will use the tablet for learning in the future. BI3. I plan to use the tablet for learning in the future.							

It was calculated that only seven out of 343 (2%) respondents answered negatively to the three questions, i.e. they do not use any kind of mobile devices in learning, have a negative attitude toward using a tablet in learning and do not intend to use tablets in learning in the future. To summarise, the statistical finding in this study show high level of students' acceptance of tablet computers use for learning in higher education.

Appendix G: Definitions Of The Constructs Used In The Development Of The Model

Table 31 Definitions of the constructs used in the development of the MALT model

Construct name and motivation type	Version of the model	Definitions	Construct type	Note
Perceived Mobility (extrinsic)	2	The degree to which learners perceive that a tablet is portable or movable.	Main	It is combined later with self-efficacy and ease of use being named perceived enablers.
Perceived Achievement (extrinsic)	2	The degree to which learners perceive that using a tablet will lead to better grades.	Main	It is combined later with usefulness being named perceived value.
Perceived Self-efficacy (intrinsic)	1,2	The degree to which learners perceive that they have the ability to use a tablet for learning.	Main	It is combined later with mobility and ease of use being named perceived enablers.
Perceived Ease of use (extrinsic)	1,2	The degree to which learners perceive that a tablet is easy to use and effort-free.	Main	It is combined later with self-efficacy and mobility being named perceived enablers.
Perceived Usefulness (extrinsic)	1,2	The degree to which learners perceive that using a tablet will enhance their learning.	Main	It is combined later with achievement being named perceived value.
Perceived Identity (extrinsic)	2	The degree to which learners perceive that they will be viewed as up-to-date and fashionable as a result of their using tablets in learning.	Main	It is changed later to perceived image to suit the TAM models, as recommended by TAM experts.

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Construct name and motivation type	Version of the model	Definitions	Construct type	Note
Perceived Willingness (intrinsic)	2	The degree to which learners perceive that they have the interests and eagerness to use a tablet for learning.	Main	It is removed later due to psychometric issue in SEM analysis.
Attitude	1,2	The learners' like or dislike of tablet use in learning.	Main	It is removed later due to psychometric issue in SEM analysis.
Actual usage	2	The actual use of tablet in learning	Main	It is removed later based on recommendation of TAM experts in that tablets are not there yet in the study context and also due to psychometric issue in SEM analysis.
University support	2	The support given by the university in providing the facilities necessary to support students' use of tablets for learning.	Moderating	It does not show any significant moderation effect on the relationships in the model during the SEM analysis.
Skill	1,2	The learned ability to use a tablet for learning.	Moderating	It does not show any significant moderation effect on the relationships in the model during the SEM analysis.
Knowledge	2	What students know about tablet computers and their use in learning.	Moderating	It does not show any significant moderation effect on the relationships in the model during the SEM analysis.

Construct name and motivation type	Version of the model	Definitions	Construct type	Note
Facility	1	All the resources and support available to students when they use tablets for learning.	Moderating	It is divided later to university support, teacher support and tablet characteristics.
Tablet characteristics	2	The salient features of a tablet that can help or hinder learners to use the tablet for learning.	Moderating	It does not show any significant moderation effect on the relationships in the model during the SEM analysis.
Discipline	1,2	The department in which students are registered, or the main subjects of their degree courses.	Moderating	There is no statistical difference between the groups of discipline in the MALT model based on the SEM analysis.
Experience	1,2	The expertise in using tablets. It means how much experience a learner has in using a tablet.	Moderating	There is no statistical difference between the groups of experience in the MALT model based on the SEM analysis.
Behavioural intention	1,2,3	The learners' behavioural intention to use a tablet for learning.	Main	Same in all versions
Perceived enjoyment (intrinsic)	1,2,3	The degree to which learners perceive that they have fun when using a tablet for learning.	Main	Same in all versions
Perceived image	3	The degree to which learners perceive that the use of a tablet for learning is a means of enhancing their status among their social groups.	Main	This construct was known as perceived identity in the second version.

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Construct name and motivation type	Version of the model	Definitions	Construct type	Note
Perceived enablers	3	The degree to which learners perceive that tablet facilities (ease of use and mobility) and self-facilities (personal self efficacy) enable them to use tablets for learning.	Main	It includes three constructs: ease of use, mobility and self-efficacy
Perceived value (extrinsic)	3	The degree to which learners perceive that using a tablet for learning is valuable.	Main	It includes two constructs: usefulness and achievement
Access	1,2,3	The quality of Internet access when using a tablet for learning.	Moderating	Same in all versions
Teacher support	2,3	The teacher supports and encourages students to use tablets for learning.	Moderating	In the first version, it was considered as facility.

*SEM = structural equation modelling
*TAM = technology acceptance model
*MALT = motivation and acceptance of learning with tablet