Exploring the Influences on Faculty Members' Adoption of Mobile Learning at King Abdulaziz University, Saudi Arabia

Leena Ahmad K Alfarani

Submitted in accordance with the requirements for the degree of Doctor of Philosophy

The University of Leeds

School of Education

February 2016

Declaration

The candidate confirms that the work submitted is her own, except where work which has formed part of solely authored publication has been included. The contribution of the candidate has been explicitly indicated below. The candidate confirms that appropriate credit has been given within the thesis where reference has been made to the work of others.

The work in Chapter One, Two, Three, and Four of the thesis has appeared in publication as follows: International Journal of Interactive Mobile Technologies (iJIM), April 2015, L.A. Alfarani

Dedication

I gratefully dedicate this thesis to my mother, my father, my lovely husband, and my wonderful children, for their unlimited support, prayers, patience, and encouragement through my study for this PhD.

Acknowledgements

In the Name of Allah, the Most Beneficent, the Most Merciful

First of all I thank Allah, my God, who has given me the power to surpass obstacles and help me to accomplish this thesis. Thank Allah for accepting and responding to my prayers and my family's prayers to sincerely accomplish this work, and I pray to my God to help me to distribute and share this thesis to let others benefit from it.

I would like to give plentiful and deep gratitude to my supervisors, Dr Maggie McPherson and Professor Neil Morris, for their great effort, valuable advice, and right guidance. I am most thankful and appreciative for their patience during the period of this research, as for over four years, they did not hesitate to provide me with the best scientific articles, outstanding advice, positive criticism and comments in order to develop my work, as well as to guide and encourage me to attend local and international conferences. I appreciate their continuous support and communication 24/7, and, finally, I can say that without their guidance and help, my work could not have reached fruition. I would like also to thank Dr Matthew Homer, Associate Professor in Quantitative Methods and Assessment, for his valuable advice and support on my quantitative data analysis. I would like to thank the judgment panel, who provided a valuable advice and positive comments on the process of the pilot survey. Moreover, many thanks to my friends who checked the thematic coding in the interview data analysis phase – I am extremely appreciative of their time, advice and support. However, they wanted their names to remain anonymous.

I am also deeply grateful to my family for their patience and support during this doctoral thesis. Particularly, I thank my mother Raja and my father Ahmed for their support and constant prayers for me to complete my studies. This research would not have seen the light without their continuous prayers and faith in me and my ability to succeed – God bless them. Extreme thanks and gratitude to my husband Hamed, who has continued to believe in me and provide a countless amount of support through my

studies, from my studies for my Bachelors, through to my Masters degree, to the end of my doctoral study. I deeply appreciate his unlimited support, love, and patience. I would like to express my sincere thanks and appreciation to my children Nada, Aseel, Hadel, Abdulaziz, and Leanne for bearing the trouble of alienation and travel, leaving their grandmother and grandfather and their relatives, and for their patience with the cultural and social changes in a country that is completely different from the country where they were born and raised. I thank them for their patience in the days that I was pushed and stressed, and I could not provide much help and care for them. I hope that I can make up for the days that passed and I did not sit in with my family due to my work in this thesis. I would like to extend my thanks to my sisters Rana, Deena, Samiah, and Sahar who just died few weeks ago, and my brother Mazen, who were wishing me good luck and success to end my thesis.

Many thanks and appreciation to King Abdulaziz University in Jeddah, Saudi Arabia, and its members who have supported me materially and morally to complete this doctoral thesis. Also, my sincere thanks and respect for the participants in the research – both in the quantitative and qualitative parts of the data collection. I profoundly thank them for the precious time they spent completing the questionnaire, and I also thank the interviewees that volunteered to give hours or more of their precious time in the interview phase, bringing abundant and rich information that influenced the results and provided clarifications and reasons for many of the questions raised in this research. Finally, I would like to thank all those who helped me and provided me with the support to complete this work.

Abstract

The primary objective of this study is to explore the perceptions and attitudes of faculty members within King Abdulaziz University in Saudi Arabia regarding various factors that may influence their current and future use of mobile devices for teaching and learning purposes.

The UTAUT and DIT theories were both utilised in this study along with two external constructs. This research employs a sequential online mixed methods approach, using quantitative statistics to illuminate qualitative findings. The sample of survey data consists of responses to 279-response online and paper-based survey. Online interviews were conducted with twenty faculty members, which added in-depth information to the research findings.

This research reveals that performance expectancy, effort expectancy, social influence, facilitating conditions, perceived trialability, perceived social norms, and resistance to change were all statistically significant, and had a direct impact on faculty members' perceptions about using m-learning, both now and in the future. However, in estimating the unique independent effect of each of the potential predictors on the faculty intention in relation to current and future use of m-learning, the results indicated that facilitating conditions, perceived trialability and perceived social norms were more likely than the other factors to influence respondent-preferences relating to their use of m-learning. In addition, the study revealed that mobile device usage was the only significant predictor from the personal characteristics of faculty members regarding the behavioural intention to use mobile learning.

The current work attempts to design a unique theoretical framework and suggests that it is worthwhile for higher education institutions to review and assess the factors that are proposed to have significant impacts on faculty members' intentions to adopt and accept m-learning in their current and future practice, as well as to look at the solutions offered as guidance for the mobile learning programme before embarking on its application.

Table of Contents

Declaration ..... **ii**
Dedication ..... **iii**
Acknowledgements ..... **iv**
List of Figures ..... **xi**
List of Tables ..... **xii**
Chapter 1 : Introduction **1**
1.1 Statement of the Problem 3
1.2 The Significance of the Study 12
1.3 The Purpose of the Study and Research Questions 14
1.4 The conceptual framework for the research 15
1.5 The Development of the Research Hypotheses 21
1.6 Assumptions 25
1.7 Structure of the Thesis 25
1.8 Conclusion 27
Chapter 2 : Literature Review **28**
2.1 The Context of the Study 28
2.1.1 Higher Education in Saudi Arabia 29
2.1.2 King Abdulaziz University 30
2.1.3 Mobile Learning in Saudi Arabia 32
2.2 Mobile Learning, Benefits and Barriers 35
2.3 Technology Adoption in Education 42
2.3.1 The Diffusion of Innovation Theory 44
2.3.2 The Technology Acceptance Model (TAM) 46
2.3.3 The Unified Theory of Acceptance and Use of Technology Model (UTAUT) 49
2.4 Conclusion 59
Chapter 3 Research Methodology **61**
3.1 Research Design 61
3.2 Research Strategy: Case Study 63
3.3 Research Method 64
3.3.1 Mixed methods 65
3.3.2 Online Mixed Methods 68
3.4 The Population 68

3.5 The Data Collection Procedure 69
3.5.1 The Quantitative Phase 69
3.5.2 The Qualitative Phase 86
3.6 The Ethics 95
3.7 Conclusion 96
Chapter 4 : Quantitative Results 97
4.1 Internal Consistency Reliability 98
4.2 Demographic Characteristics 99
4.3 Data Analysis for the Main Research Question 103
4.3.1 Analysing the Influence of Social Norms on the Use of m-learning 103
4.3.2 Analysing Gender Differences and Social Norms 106
4.3.3 Conclusion 107
4.4 Data Analysis for the Second Research Question 107
4.4.1 Normality Tests 108
4.4.2 Exploring the Influence of Each Construct 108
4.4.3 Exploring the Combined Influence of all Constructs 109
4.4.4 Conclusion 111
4.5 Data Analysis for the Third Research Question 112
4.5.1 Normality Tests 112
4.5.2 Exploring the Influence of Each Variable 113
4.5.3 Exploring the Combined Influence of the Variables 113
4.5.4 Conclusion 115
4.6 Additional Information 115
4.7 Testing the Correlations between the Seven Factors 118
4.8 Conclusion 120
Chapter 5 : Qualitative Results 122
5.1 Open-Ended Questions 122
5.1.1 Categories and Themes 123
5.1.2 Conclusion 130
5.2 Interview Data Analysis 131
5.2.1 Interview Questions 131
5.2.2 The Pilot Study of the E-Interview 134
5.3 The Main Interview Process 136

5.3.1 The Reliability and Validity of the Interview Data 137
5.3.2 Analysis of the Interview Data 138
5.4 Conclusion 174
Chapter 6 : Discussion of the Quantitative Results 176
6.1 The Research's Theoretical Framework 176
6.2 The Current and Future Use of M-learning 177
6.3 The Influence of Performance Expectancy on M-Learning Acceptance . 179
6.4 The Influence of Effort Expectancy on M-Learning Acceptance 181
6.5 The Impact of Social Influence on M-Learning Acceptance 182
6.6 The Influence of Facilitating Conditions on M-Learning Acceptance 183
6.7 The Influence of Perceived Trialability on M-Learning Acceptance 184
6.8 The Influence of Perceived Social Norms on M-Learning Acceptance .. 186
6.9 The Influence of Resistance to Change on M-Learning Acceptance..... 189
6.10 The Correlation Between the Seven Factors 191
6.11 The Association between Demographic Data and M-Learning Acceptance 193
6.11.1 Gender 193
6.11.2 Age 195
6.11.3 Academic Qualifications 196
6.11.4 Years of Teaching Experience 197
6.11.5 Characteristics of Mobile Use 198
6.12 Conclusion 200
Chapter 7 : Discussion of the Qualitative Results 201
7.1 Teachers' Current Use of M-learning 202
7.2 Attributes of M-learning Use 204
7.2.1 Teachers' Awareness and motivation 204
7.2.2 Developing Saudi Higher Education 205
7.2.3 The Enjoyment Factor 206
7.2.4 Pedagogical Awareness 206
7.2.5 Gender Differences 208
7.3 Barriers to Using M-Learning 210
7.3.1 The Conservativeness of Saudi Universities 210
7.3.2 The Misuse of Mobile Devices 212
7.3.3 The Privacy of Women in Saudi Society 215

7.3.4 Lack of Knowledge 216
7.3.5 The Lack of Resources 217
7.3.6 Technical Support Team 222
7.3.7 University Encouragement 223
7.3.8 Faculty and Student Trialability Availability 223
7.3.9 Teachers' Resistance to Change 224
7.3.10 Skills in Using Mobile Devices 226
7.3.11 M-learning Anxiety 227
7.3.12 Ownership 227
7.4 The Future Use of M-learning by University Teachers in Saudi Arabia 229
7.5 Conclusion 231
Chapter 8 : Conclusion 232
8.1 Research Summary 233
8.1.1 The Main Research Question 233
8.1.2 Research Question 1 235
8.1.3 Research Question 2 240
8.1.4 Research Question 3 246
8.2 The Contributions and Implications of the Research 248
8.3 Limitations 255
8.4 Recommendations and Future Research 257
References 259
Appendix 1 293
Appendix 2 304
Appendix 3 308

List of Figures

Figure 1.1: The Research Model 16
Figure 1.2: Phases in a research Process (Galliers and Land, 1988) 26
Figure 1.3: The Research Phases Process 26
Figure 2.1: A Map of the Kingdom of Saudi Arabia 28
Figure 2.2: The Technology Acceptance Model (Davis, 1989) 47
Figure 2.3: The UTUAT Model (Venkatesh et al., 2003) 51
Figure 3.1: Research methodology (Sequential Explanatory Strategy) 66
Figure 3.2: The deductive approach (Trochim, 2006) 94
Figure 3.3: The inductive approach (Trochim, 2006) 94
Figure 4.1: Percentage Breakdowns of Participants' Age Groups 101
Figure 4.2: Percentage Breakdowns of Participants' Academic Degrees 101
Figure 4.3: Percentage Breakdowns of Participants' Positions 101
Figure 4.4: Percentage Breakdowns of Participants' Teaching Experience ... 101
Figure 4.5: Percentage Breakdowns of participants' mobile device usage 102
Figure 4.6: The Factors Influenced by Demographics 117
Figure 5.1: Codes developed a priori from the template of codes (deductive theory-driven code approach) 141
Figure 5.2: Codes developed from the data-driven inductive approach 168
Figure 6.1: The most significant moderators of the intention to use m-learning 179
Figure 8.1: Final Research Model 250

List of Tables

Table 2.1: The Previous Literature in the Field of Mobile Learning Adoption Based on the UTAUT 57

Table 3.1: Internal Consistency Reliability for Mobile Learning Subscales 78

Table 3.2: The sections and construct items developed after the pilot test..... 83

Table 3.3: Quantitative analysis for research questions and hypotheses..... 85

Table 4.1: Internal Consistency Reliability for Mobile Learning Subscales 99

Table 4.2: Descriptive Statistics of the Current and Future Use of M-learning. 104

Table 4.3: Independent Samples T-test of the Social Norms items 105

Table 4.4: Descriptive Data and Independent Sample t-tests on Social Norms in relation to Gender 107

Table 4.5: Descriptive Statistics and Independent T-tests for the Seven Constructs and the Two Groups of Intention to Use M-learning..... 109

Table 4.6: Binary Logistic Regression of the Second Research Question..... 110

Table 4.7: Chi-square Test and Independent T-tests of the Variable 113

Table 4.8: Binary Logistic Regression test for the second research question. 114

Table 4.9: Independent T-tests and one-way ANOVA Tests on Independent Variables for each of the Seven Constructs 116

Table 4.10: Correlations between the model constructs..... 119

Table 5.1: Categories and Themes Emerging in Open-Ended Survey Items .. 124

Table 5.2: Demographic Data of the Interviewees 139

Table 5.3: Codes developed a priori from the template of codes (Deductive Approach) 149

Table 5.4: Data-driven codes with segments of text from the interviews (Inductive Approach)..... 171

Acronyms

B-Learning	Blended Learning
HE	Higher Education
ICT	Information Communication Technology
IT	Information Technology
KAU	King Abdulaziz University
KSA	Kingdom of Saudi Arabia
M-Learning	Mobile Learning

Definition of Key Terms

For the purpose of this study, the following definitions are used:

Blended Learning: "the combination of traditional face-to-face and technology-mediated instruction" (Graham et al., 2012, p.1).

Digital Natives: "People who have grown up with, and become familiar with, digital technology such as computers, the internet, mobile phones" (Kukulska-Hulme et al., 2011, p.61).

E-Learning: "electronically mediated asynchronous and synchronous communication for the purpose of constructing and confirming knowledge" (Garrison, 2011, p.2).

Faculty: "teaching members of the administration who have academic degrees in particular fields that are qualified to teach in an educational institution" (Alsadoon, 2009).

Information and Communication Technologies (ICTs): "the varied collection of technological gear and resources which are made use of to communicate and to generate, distribute, collect and administer information" (Sarkar, 2012, p.31).

Mobile Learning: In relation to my research context, mobile learning refers to a learning mode that enables m-pedagogic theories to enhance learners' experiences and facilitates two-way interactive networks between learners and instructors anytime and anywhere, and is empowered through advanced mobile technology in on-line and off-line modes.

Mobile Learning: "A learning model that provides ubiquitous, mobile, and anytime access to educational and university resources empowered by mobile technology in its connected or disconnected form" (Akour, 2009, p.33).

Smartphone: "A mobile phone that offers expanded features such as music, video, gaming, pictures, web browsing, and mobile TV. These mobile devices may have larger screens, more powerful processers, full qwerty keyboards, and touch screens" (Crisp and Williams, 2009, p.13).

Chapter 1 : Introduction

"There is a strong link between culture and learning that is reflected in how people prefer to learn and how they tend to process information" (Samovar, Porter & McDaniel, 2009, p.338).

Information and Communication Technologies (ICT) have undergone rapid changes and developments during the past few years, and this has had a strong impact on the higher education (HE) sector (Sarkar, 2012). The growth of the internet and ICT has driven higher education institutions to take advantage of a wide variety of technologies in teaching and learning in order to keep up with the information age. These changes have led to the need to re-imagine and re-conceptualise the role of ICT in the learning process, and to understand the impact of using digital networks in order to provide support for virtual and real communities.

Many face-to-face, online learning and distance courses integrate ICT within higher education through the use of email, social networks, online resources and various synchronous and asynchronous programmes for student learning (Gomez, 2012). Data concerning ICT's impact on education has received detailed examination in the literature. It is believed that using ICT in education can improve the quality of education by increasing student enthusiasm for learning, thus making it easier to develop basic student skills (Ramsey, 2011; Livingstone, 2012; Morris, 2010). Moreover, it facilitates teachers' implementations of student-centred ICT pedagogies that allow access to learning materials at any time and place, and this has been shown to improve students' learning outcomes (Hu and Webb, 2009). Furthermore, ICT provides a way to participate in the knowledge society, and is a powerful modern teaching tool for the Twenty-first Century as it enables the quality of education to be enhanced through advanced teaching methods (Shirazi et al., 2009). However, technology does not always meet up to its promises, particularly in developing

countries, where various obstacles such as weak infrastructures limit both its use and its effectiveness (Sarkar, 2012).

The obstacles are not limited to shortages in technological provision and ownership, but are also rooted in pedagogical beliefs and community culture. Social norms and culture were found to have a high impact on the adoption of technology in particular countries. Cultural and gender differences relating to technologies can be used to predict the initial acceptance of these technologies and their future use (Al-Oteawi 2002; Loch et al., 2003). Thus, the cultural beliefs and attitudes towards technology of the country in which it is being (or will be) used need to be better understood in order for it to be appropriately adapted to the behavioural norms and standards of that country, rather than attempting to "force-fit" the culture to the technology (Loch et al., 2003).

A body of research in developing regions has found that a lack of infrastructure for integrating technology into higher education has helped to expand the "digital divide" between developed and developing countries (ITU, 2009; Clothey, 2011; UNESCO, 2012). It has been suggested that one way to begin to reduce this divide is through mobile learning technology. The extant literature in this area produces evidence that supports the effectiveness of mobile technology in learning and teaching. This success is grounded in extending learning and teaching beyond the traditional teacher-led classroom, expanding the accessibility of learning opportunities, providing flexible learning materials for use at any time and place, generating new methods of technology-enhanced learning, allowing new modes of teaching to distance students, and encouraging students' active participation in the learning context (Guy, 2010). Many students already own and use mobile phones, and thus teaching and learning that utilises this technology could find a broad audience of capable users in developing countries (UNESCO, 2009; ITU, 2011; Clothey, 2011).

Recently, a significant body of research has focused on mobile learning (m-learning) and its integration into higher education, mainly in relation to user-acceptance of m-learning (Jairak et al., 2009; Liu et al., 2009; Nassuora, 2012; Liaw and Huang, 2012). Because of international variations in educational, economic and cultural factors, m-

learning is not used in the same way across all countries (Jairak et al., 2009). For instance, in the Kingdom of Saudi Arabia, m-learning is in the early phase of its implementation (Nassuora, 2012), and the decision to use mobile education formally in Saudi universities was a very recent one.

Although the user-acceptance of technology has been examined in a variety of contexts – for example, in business (Lee et al., 2013; Straub et al., 1997) and education (Abbasi et al., 2015) – these studies have produced different results and conclusions based on the environments in which they have been performed. It should be noted that within educational contexts, teachers' attitudes towards accepting particular technologies are not necessarily similar to those of students as a result of differences in their objectives of using technologies and differences in individual behaviours and attitudes. Therefore, research is required to discover what factors influence the adoption of m-learning technology in higher education, as well as the impact that it could have in different teaching and learning environments.

The purpose of this study is to uncover the factors that affect the adoption and use of m-learning by faculty members of a university in Saudi Arabia (SA). Although the adoption of m-learning requires the involvement of all the components of the educational process, including administrators, faculty and students, this thesis focuses primarily on the adoption and acceptance of mobile technology from a faculty perspective.

1.1 Statement of the Problem

Globally, technology promises to meet the demands for tertiary education (Littlejohn and Pegler, 2007) through several styles of learning, including electronic learning, blended learning, online learning, and mobile learning. Electronic learning (e-learning) involves delivering and facilitating knowledge through electronic mediums synchronously or asynchronously. Locally, Saudi higher education has been experiencing a quantum leap in the number of higher education providers and in the growing student demand for higher education. As a result, there has come to be an urgent demand for educational development, which is also an important response to

recent developments in Information and Communications Technology (ICT) and increasing student willingness to use ICT for learning (Alsaadat, 2009). In addition, university students have now become more open and keen to use ICT and its resources in a way that requires universities to shift from the use of traditional modes of education to teaching and learning methods that are more flexible, productive and effective, involving the different styles of learning that are stated above.

However, there is a lack of awareness concerning the practical skills and experiences that students could gain if more innovative methods were utilised. What's more, local studies reveal that Saudi public school teachers do not use self-directed learning in their classrooms, which impacts negatively on the students' skills and progress, as well as providing insufficient guidance and feedback for them (Al Saadat, 2006). Lecture-based classes also represent the standard pedagogical approach in Saudi universities (Alebaikan, 2010), and traditional textbooks remain the main sources for teaching and learning in all educational levels of the Saudi educational system. With regards to the effectiveness of textbooks, Alharbi (2004) and Al-Abdulkareem and Hentschke (2014) found that the ones that Saudi teachers use with their students may be lacking in terms of their utilisation of constructivist theories.

Although integrating ICT into education is not a simple process, and may represent a difficult transition from traditional practices for some educational providers (Onwu and Ngamo, 2010), these old-fashioned approaches to teaching and learning do not fit with the aspirations of 21st Century learners, and thus should not be continued to be used (Guy, 2010; Kukulska-Hulme and Jones, 2011; Sarkar, 2012). There is an 'educational loop' in Saudi teaching and learning, with learners being taught using the conventional style from primary school through to university, and then continuing to use this style when they become teachers – feeding their students learning content from the same spoon that they were fed from themselves, using the same teaching methods that they were taught with. This creates a generation of students that lack the technological skills and practices that are urgently needed for updating the traditional teaching cycle and improving the quality and standard of education. However, in order for Saudi universities to make a successful transformation into this arena, they need to

counter the challenges of the accumulated inheritance of traditional education methods that do not fit with these new learning techniques.

As Saudi universities need to meet the growing demand for higher education, they are also under pressure to increase the number of skilled and innovative faculty members who can provide high quality contemporary teaching and learning (Alebaikan, 2010). Blended learning has come to be seen as an alternative delivery method for facilitating a gradual shift towards technology-enhanced learning, enabling students to benefit from both e-learning and conventional learning (Garrison and Kanuka, 2004). Blended Learning (B-learning) is described as "the combination of traditional face-to-face and technology-mediated instruction" (Graham et al., 2012, p.1). Moreover, B-learning is a suitable method for changing the teaching pedagogy from being "faculty-centred" to "student-centred", thus engaging students more in their own learning practices (Onwu and Ngamo, 2011).

The need to integrate technology into education seems clear-cut. However, its acceptance in Saudi tertiary education remains low, with many faculty members still resisting change because of the challenges this presents. Numerous research projects have explored the benefits and challenges of B-learning in Saudi universities (Alshumaimri et al, 2011; Almalki, 2011; Alebaikan, 2010), and concluded that ICT could improve higher education if used correctly (i.e. through effective pedagogical and technical design). From the pedagogical side, Alharbi (2015) found that there is little use of ICT to support the constructivist learning environment, and that this needs to be addressed as ICT is not being fully utilised to realise goals. From the technical side, Al-Jarf (2006) confirmed that teachers' competence with and transition to using ICT is low because of issues related to the costs of owning a computer, internet access, and academic training. Thus, despite government initiatives promoting ICT, teachers have little desire and motivation for change, and this presents an obstacle to improving education. Thus, determining the particular factors that affect faculty acceptance of technology is vital. In addition, another mode of teaching and learning, the tools for which are already present in faculty members' pockets and with which they may be familiar – e.g. mobile learning – also has the potential to provide a good means for improving HE in Saudi Arabia.

The advantages and opportunities offered by m-learning technologies have created a new era in the information age. One core advantage of m-learning is that it enables students to engage in learning whenever and wherever it is appropriate for them to do so, as they are able to access resources and to communicate using mobile devices from numerous locations (Mediano et al., 2009; Morris, 2010). Mobile learning is often perceived as providing strong support for self-directed learning, having the ability to enhance learning in different contexts and to encourage learning within both informal and formal frameworks (Cheung et al., 2011). In the Saudi context, m-learning has been observed as a response to large-scale projects, the increased demand for education, limitations in capital and labour, the boundaries to access for students who are large geographical distances from educational institutions, and traditional cultural norms (Almarwani, 2011). Overall, m-learning has been widely accepted and utilised by many universities.

The increase in Saudi tertiary students' possession of mobile devices with web browser technology (such as Personal Digital Assistants (PDAs), smart phones (e.g. iPhone, Android devices), and tablets (e.g. iPads)) has been clearly observable. Such increases are possibly the result of the rapid progress in technology and the accompanying decreases in prices for devices with internet functionality. Although the use of m-learning is not required by Saudi educational institutions, the number of students that use mobile devices as educational resources continues to rise sharply (Al-Fahad, 2009; Chanchary and Islam, 2011; Nassuora, 2012; Zahrani, 2010). Saudi universities face many challenges in utilising m-learning, a central one being how to encourage teachers to use such technology rather than simply continuing to practice traditional approaches to learning and teaching (Alebaikan, 2010). University teachers still use traditional methods in the sense that the students still learn from textbooks or PowerPoint slides even when teachers use interactive digital content in their teaching (e.g. PowerPoint, Prezi, or videos).

What makes matters worse is that Saudi higher education has failed to meet the requirements of the Saudi labour market and provide it with students who are able to effectively deal with global challenges (Al-Asmari, 2008; Alzu'be, 2012; Baki, 2004). As the Saudi labour market is conditioned and challenged by changes in the Saudi

educational system, curriculums and traditional methods of teaching need to be renovated, and should adopt the successful alterations made by others that use alternative educational methods with proven effectiveness (Alzu'be, 2012). Consequently, Saudi universities need to be updated to meet the needs of students and to improve the quality of Saudi higher education (Alshayea, 2012). Alnahdi (2014) has emphasised the importance of taking advantage of developed nations' experiences for successfully reforming Saudi higher education, and for carefully planning the process of change, which is not a process of simply changing the content of the textbooks. The benefits of using mobile devices for changing the way in which teaching is undertaken and to provide a richer depth of educational experiences is clearly evident in the literature (Chen et al., 2008; Corbeil and Valdes-Corbeil, 2007; Kim et al., 2006; Kukulska-Hulme, 2009; Morris, 2010; Morris et al., 2012; Sharples et al., 2009). Hence, deploying m-learning might change teachers' pedagogical beliefs regarding the teaching technique that they have practised for a lengthy period of time.

Despite its promising potential, there are several obstacles that may effect m-learning's adoption in Saudi universities. These include a lack of awareness amongst educators about the potential benefits of integrating the use of mobile devices within the learning and teaching process. In addition, it is not clear whether university teachers are able and ready to implement this new trend in their professional practices, or whether they are aware of the knowledge and resources that are available to support them in successfully deploying m-learning. Furthermore, as stated earlier, Saudi Arabia has unique social norms and traditions, and hence the question emerges of whether Saudi social norms support or conflict with the adoption of smartphones and ubiquitous devices in educational contexts, and whether transforming traditional ways of teaching through the use of blended m-learning will enhance Saudi higher education or not.

Moreover, is m-learning the right technology-based solution to adopt for self-directed learning and social constructivist pedagogical approaches in higher education in Saudi Arabia? Would it be better to make use of university ICT rather than m-learning? I contend not, as using computers and the internet requires infrastructure to help learners to access learning resources easily and quickly (ITU, 2009), but Saudi universities are

severely lacking in ICT infrastructure (Alebaikan, 2010), which means that they have not been able to effectively incorporate technology into education via this means. Given that m-learning does not require infrastructure, the best solution for utilising technology in higher education in Saudi Arabia (at least in the short-term) is through m-learning (Alshayea, 2012). In addition, the increasing number of smartphones and internet-connected device subscriptions in Saudi Arabia shows that mobile technology is present in both instructors' and students' pockets – something which could easily could be exploited as a means for blending the use of technology into the teaching and learning process.

Although m-learning is at an early stage of development in KSA, there is already a body of research addressing concerns about it (Al-Fahad, 2009; Al-Khalifa, 2008; Almarwani, 2011; Altameem, 2011; Chanchary and Islam, 2011; Nassuora, 2012). As m-learning is in its infancy in KSA, understanding user-acceptance of it there is crucial, because modern technology cannot improve education if it is not successfully adopted. Students are often strongly attached to their mobile devices, and placing this technology within their education process may thus enhance their learning environment. Recently, a number of research projects on students' perceptions of mobile learning and its impact on educational practices in KSA have demonstrated that despite barriers to the use of mobile technology in the student learning processes, students are still willing to accept it and use it in their learning (Al-Fahad, 2009; Al-Khalifa, 2008; Nassuora, 2012). On the other side, Aljuaid et al. (ND) examined lecturers' readiness for mobile learning at Taif University in terms of perceived usefulness and perceived ease of use, and found that both factors had a significant influence on readiness for m-learning (ibid). This study did not test more important factors, such as the teaching environment for the use of m-learning, the faculty's resistance to change, or social norms. Although there are a small number of studies exploring student perceptions concerning the use of m-learning, the adoption of m-learning by faculty members and the factors that deter their use of it remains a gap that needs to be addressed in the Saudi research market. Globally, extensive research has been conducted on the acceptance of m-learning by teachers and students, but the

research in the Saudi literature has focused purely on its acceptance by students rather than faculty members.

However, the adoption of mobile learning technology in particular cultures can be a difficult process, as it is widely accepted that the culture within a nation or an organisation shapes individuals' perceptions of innovations that bear directly on their lives (Loch, Straub and Kamel, 2003). Cultural differences, such as those involving gender perceptions, can generate different attitudes towards various kinds of technologies, and are key factors for both the initial acceptance of these technologies and their future use (Al-Oteawi 2002; Loch et al., 2003). Studying teachers' cultural perceptions about these technologies is particularly important in developing countries, as ICT is not fully and equally embedded in their educational cultures, and mobile learning technologies may not be well received by faculty members in higher education as a result of various cultural influences. Saudi Arabia is a good example of a developing nation whose intellectual and cultural traditions are underpinned by demographic variables (such as gender) that differ significantly from those in western cultures, and which have a significant impact on the attitudes and subjective norms that influence behavioural intentions concerning the use of technology (Baker et al., 2007). Thus, the study of both social norms and gender were included in the conceptual framework and design of this research in order to examine whether these factors are obstacles that may hinder the effective adoption of m-learning in Saudi universities.

In addition, after consideration, I saw the merit of focusing in on social norms over other factors in order to make my research distinct and original, as there is no extant research examining the influence of social norms on faculty members' acceptance of mobile learning technology in Saudi higher education environments. In addition, understanding the interaction between social norms and gender differences in relation to mobile learning technology is essential for the design and development of ways to successfully integrate it, broaden its users, and increase its acceptance.

Despite extensive research on m-learning in higher education in the United States, Britain and other countries, the literature shows that there is lack of systematic study

concerning why m-learning has not been adopted by higher education faculty members1 in some Arab countries. In addition, I believe that before deploying any technology into the workspace, the end-users' intentions to adopt and use this technology must be realised. This study focused on university teachers, as a significant body of research has studied the factors that influence students' acceptance and usage of mobile learning (Cheon et al., 2012; El-Gayar and Moran, 2006; Jairak et al., 2009; MacCallum and Jeffrey, 2013; Nassuora, 2012; Thomas et al., 2013), whilst little has focused on the teachers in this area. Moreover, the small amount of recent research on the topic of teachers' accepting mobile learning in higher education provides further evidence of the need for this type of research (Akour, 2009; Ifenthaler & Schweinbenz, 2013; MacCallum and Jeffrey, 2013). Because there are differences in the perceptions between students and teachers regarding m-learning acceptance, the factors that have a significant impact on learners may be different from those that have a significant impact on faculty members in determining their m-learning adoption, which, in turn, could help me to verify what factors should be integrated into the research model.

Hence, it is important to understand what mobile learning actually is, whether it is clearly understood by faculty members, what encourages and discourages their adoption of mobile learning, what the current level of utilisation of this technology is, and whether it will continue to be used in the future. The faculty's vision regarding educational development that utilises ICT is an essential component for determining the success of the technological integration process in tertiary education (Onwu and Ngamo, 2010). Therefore, the attitudes, thoughts and practices of faculty members at King Abdulaziz University (KAU) regarding ICT integration and mobile learning (m-learning) were investigated with the aim of creating a foundation on which to build a general framework concerning the current use of m-learning in the Saudi higher education system as a whole. In brief, the primary purpose of this study is to examine faculty perceptions about using m-learning as a face-to-face learning resource, which affects the dissemination of the m-learning culture in KAU, particularly those factors

[1] Administrators' attitudes towards university utilisation of m-learning are beyond the focus of this study.

relating to attitudes and pedagogy, Saudi university norms and cultures, and technology.

The proposed factors for exploration were based on consideration of the research problems, which suggested that it is important to discover the possible outcomes of blending new technology in the teaching and learning process from the technological dimension – whether mobile devices are useful and easy to use for educational practices, whether facilities surrounding this technology are available, and whether m-learning is trialable – which means that the faculty and students are able to design and try m-learning before it is officially deployed. In addition, in considering the pedagogical dimension, it is essential to enquire about whether traditional teaching methods are effective for new generations of students or whether utilising new and innovative educational methods would be more effective, as well as whether the university's teachers are ready to blend m-learning within their professional practices or whether they are still resisting such change. Finally, social culture and norms are believed to have a bearing on outcomes relating to the adoption of technology (Avgerou, 2000) and are perceived to have a negative impact on the adoption of mobile devices for learning in Saudi higher education contexts. Exploring this factor requires examining issues around the use of mobile devices and restrictions regarding their use in education. For instance, it is important to explore the issues of Saudi conservativeness with relation to the existence of the camera function found in most portable devices, women's privacy, students' misuse of mobile devices in the learning process, and whether faculty members are influenced by others peers or their students to use m-learning within their professional practice. Thus, I have chosen to focus on social norms and gender above other determinants of technological acceptance as these are central for understanding the obstacles to the successful adoption and integration of technologies. The focus of this study is the examination of how Saudi social norms and gender differences (along with other factors) impact on mobile learning usage within the gender-segregated faculty of higher education in Saudi Arabia.

1.2 The Significance of the Study

The growth in the number of Saudi students aiming to obtain a high quality education and to keep up with their peers in universities in other parts of the world (developed regions) should encourage higher education institutions in Saudi Arabia to integrate mobile technology into teaching and learning processes. As already noted, the growth of mobile learning depends primarily on the participation of teachers and their beliefs in the possibilities that this technology has for enhancing learning (Onwu and Ngamo, 2010). As teachers play an active role in successfully integrating technology into education, it is important to understand the factors that encourage or discourage their participation in education utilising mobile technology (Harris et al., 2009). In addition, understanding the challenges that may accompany the adoption of new technology is essential both for predicting teachers' attitudes towards it and for assuring its successful deployment (ibid).

This research contributes to the body of knowledge that exists in relation to the research model by confirming what factors impact on faculty members' acceptance of the use of m-learning. The current work attempts to design a unique theoretical framework and suggests that it is worthwhile for higher education institutions to review and assess the factors that are proposed to have significant impacts on faculty members' intentions to adopt and accept m-learning in their current and future practice, as well as to look at the solutions offered as guidance for the mobile learning programme before embarking on its application. In addition, determining the impact of Saudi social norms and culture on the university community's intentions to adopt and use m-learning inside campuses will help the university administration and policy makers to address this issue and this, in turn, will help instructional designers to create and programme successful and effective mobile learning schemes that best fit this society's customs.

In addition, the Saudi government has made many efforts to enhance the educational system over the last five years, whose quality is perceived to be low (Alamri, 2011). As a result, the low achievement of universities has led to a large proportion of undergraduate students lacking the skills needed for the country's growth (Alshayea,

2012). Saudi scholars are aware of these problems, and have offered a number of explanations for them (Alamri, 2011; Alebaikan, 2010; Alshayea, 2012). One of these explanations is that the use of traditional teaching methods by faculty members leads to a shortage in high quality teaching provision. In a time when the role of the teacher in developed countries has changed as a response to the requirements of the information age, this represents a critical problem in Saudi Arabia (Alebaikan, 2010), leading current and future generations to fall further behind their peers in developed societies (Clothey, 2011). Therefore, the need to take a firm stand and to make radical transformations in HE is urgent, and using different instructional methods is one way of motivating students to attain higher goals (Alamri, 2011).

The introduction of m-learning opportunities will help Saudi universities move away from formal classroom training and education towards teaching and learning that does not require classrooms. In addition, new methodologies of teaching and learning can be integrated into practical instruction. M-learning provides a new and interesting teaching and learning environment (Wang et al., 2009) that has had a positive effect on tertiary education. Thus, there is an urgent need to investigate and identify the determinants for university educators' use of handheld mobile devices for blended learning in Saudi Arabia.

Moreover, the results of this research will encourage the faculty members to understand the challenges that they may face through using m-learning so that they can work through these issues before they officially adopt it in the future. Furthermore, students' willingness to use mobile devices for learning will benefit them in terms of academic achievements and gaining the practical and technological skills needed to meet the demands of the Saudi labour market and keep up with global changes. Indeed, increasing the number of university teachers who are willing to integrate m-learning in their professional practices will help in increasing a culture of m-learning amongst other colleagues and students which, in turn, will help to raise the quality of the university.

This study will help officials in higher education institutions in Saudi Arabia and the Arab world in general to better understand the needs, concerns and interests that faculty members may have regarding integrating m-learning into their teaching

practices. Specifically, the results of this study will help Saudi universities to develop effective and reliable blended learning programmes by: (a) giving an overview of the current possibilities presented by m-learning and its impact on teaching and learning, (b) revealing faculty perceptions about the positives and negatives associated with using m-learning, (c) showing which attributes of m-learning can be used to increase its adoption by teachers in order to respond to the increased demand for this type of education, and (d) showing how understanding the relationship between society, culture and faculty members' acceptance of m-learning could greatly benefit Saudi Arabia and Middle Eastern countries that share similar educational cultures.

The study will also look at the experiences of teachers who have used m-learning in the King Abdulaziz University (KAU) in order to explore the current use of m-learning in Saudi Arabia and higher education specifically. The goal here is to extend the research in the near future and to use its results to conduct research on teachers who are willing to use this technology. Furthermore, the research methodology utilised in this research could inform future research concerning how to deal with gender segregation in the Saudi research context. That is, conducting qualitative research in Saudi Arabia in any sector of the work place – whether in education or business – that involves both male and female perceptions could use online interviews as this method helps to address the issue of males coming into contact with females for research in education or other areas. Also, the study presents numerous recommendations for future research in the last chapter, which, if followed, would promote teacher-led research in Saudi higher education and enrich the literature of mobile learning. This, in turn, would enlarge the Arab literature, which currently has a lack of studies on the adoption of m-learning and the interventions that could be used to enhance it in higher education settings. Further implications and contributions of this research are presented in Chapter Eight.

1.3 The Purpose of the Study and Research Questions

The purpose of this study is to explore the factors that may influence the faculty's acceptance and adoption of mobile learning in their current and future use of blended

learning in Saudi higher education. This research aims to address the following research questions, beginning with the main one:

How does Saudi culture influence faculty members' adoption of mobile learning in Saudi higher education, and is gender an important factor for its uptake within this constituency?

The study will be guided by the following research sub-questions:

1. In what ways are teachers currently using mobile learning with their students inside the classroom? How do teachers perceive the future of mobile learning?
2. Which of the following independent variables (if any) are significant predictors of the behavioural intention to use mobile learning: performance expectancy, effort expectancy, social influence, facilitating conditions, trialability, social norms, and resistance to change?
3. Is there a statistically significant relationship between faculty members' personal characteristics (including gender, age, years of teaching, academic rank, mobile device and internet usage) and their perceptions towards using mobile learning?

1.4 The conceptual framework for the research

It is difficult to reach an answer regarding whether there is a single set of variables responsible for user acceptance. However, a number of researchers have shown that there are many variables affecting the adoption of a particular piece of technology. Two theories were used to explore the current state of m-learning's use in higher education in Saudi Arabia – the Unified Theory of Acceptance and Use of Technology (UTAUT, Venkatesh et al., 2003), which includes the four constructs of performance expectancy, effort expectancy, social influence, and facilitating conditions; and the Diffusion of Innovation Theory (DIT; Rogers, 2003), which includes the single factor of trialability. Although some researchers consider DIT as an outdated linear innovation diffusion model, it is still used widely in the technological adoption research and in several sectors including education, banking and organisation (Al-Jabri and Sohail, 2012; Lee et al., 2013).

In addition, two other factors were proposed to have a direct and significant impact on faculty acceptance of m-learning – resistance to change and social norms. Thus, seven factors in total were examined in this study in order to identify the key determinants of faculty members' participation in m-learning in Saudi Arabia. Figure 1.1 below presents the research model for this study, and the factors that the research hypothesised to be influential are defined as follows:

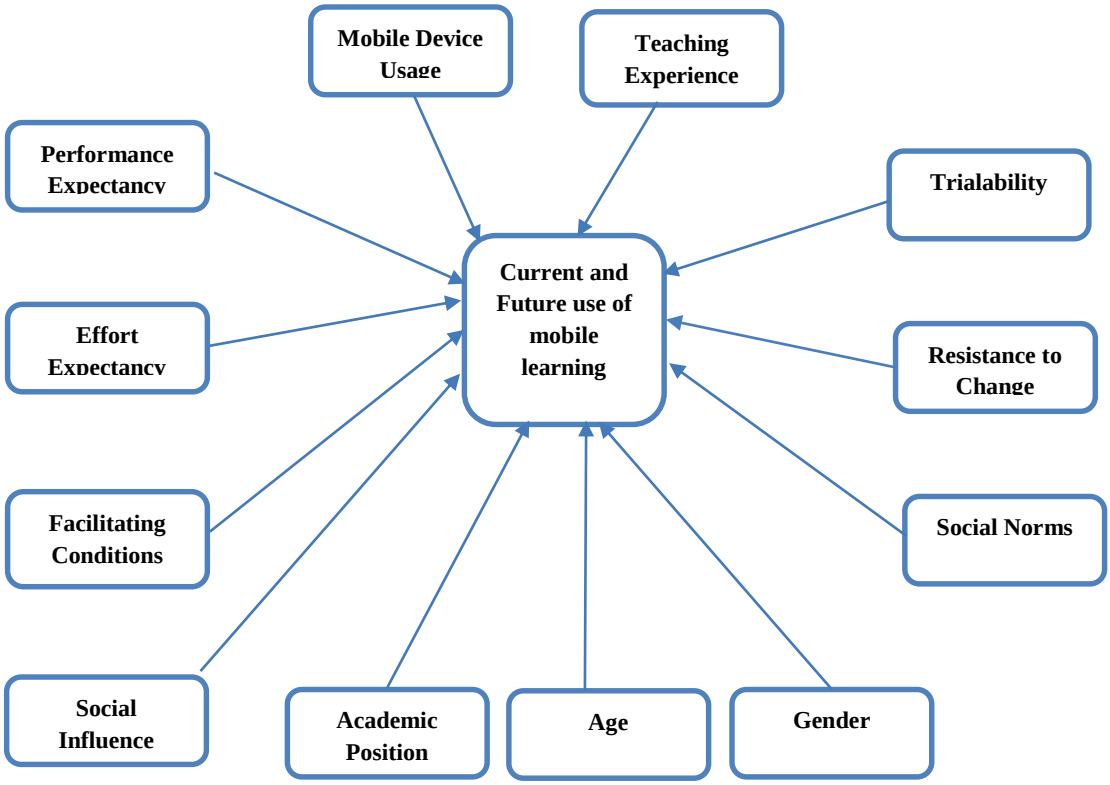

Figure 1.1: The Research Model

Performance expectancy (perceived usefulness in the TAM model) was initially defined by Venkatesh et al. (2003) as "the extent to which a person believes that using a system would enhance his or her job performance". In this research, in exploring user acceptance of m-learning, it was assumed that performance expectancy was the main factor to influence the actual use of mobile technology. Performance expectancy here involves faculty members finding mobile learning useful because it enables them

to access information quickly, at anytime and anywhere, and on their choice of device. However, with the limited amount of research conducted in this area with university teachers, further studies are needed to determine the effect of usefulness on mobile learning.

Effort expectancy (perceived ease of use in the TAM model) refers to "the degree to which a person believes that using a particular system would be free of mental effort" (Venkatesh et al., 2003). Effort expectancy is also one of the most major factors presumed to affect the use and acceptance of mobile devices by the faculty. Effort expectancy decreases over time as the user gains greater experience (Donaldson, 2011). In a study on the acceptance rates of mobile technology, Carlson et al. (2006) found that effort expectancy had a positive influence on user intention to use mobile services and devices.

Facilitating conditions are given by the extent to which the individual believes that the institution and infrastructure are available to support the use of innovation (Venkatesh et al., 2003). There are a number of indicators for facilitating conditions relating to the use of mobile technology – the knowledge and resources that are available for the use of m-learning, infrastructure, training, support teams and university encouragement – which will all be considered in this research. The lack of training and support for mobile learning may be a potential obstacle to its adoption (Donaldson, 2011), and Naismith et al. (2004) identified student and staff training in using mobile learning as an important element for the effective use of mobile devices. In this research, facilitating a basic infrastructure for the adoption of new technology becomes an important construct.

Social influence (subjective norms in the TAM2 model) is the extent to which individuals feel that others believe that they should use the technology (Venkatesh et al., 2003). According to Nicolas and his colleagues (2008), social influences are divided into two types – external influences and interpersonal influences. In this study, 'external social influence' refers to the effects of student willingness to use m-learning on faculty members' adoption and use of m-learning, whereas 'internal influence' considers the effects that faculty members have on each other in relation to the adoption and use of m-learning.

In my research context, the social influence hypothesis was presumed to strongly affect faculty members' intentions to accept and use mobile devices in the academic setting. Social influence has been shown to decrease over time as the user gains greater experience (Donaldson, 2011). Although mobile devices are used with a greater frequency by women than by men (Donaldson, 2011), this study might produce different findings due to the social norms found in the Saudi society. Furthermore, Davis et al. (1989) noted that social influence might indirectly affect behavioural intentions to use technology, and they called for further study into social norms to provide a better understanding of the impact of social influences on user acceptance of technology.

In addition, further factors were added to the research model (trialability, resistant to change and social norms), which will now be discussed.

Perceived trialability was derived from Division Innovation Theory (Rogers, 2003). The perceived attributes for the diffusion of mobile learning – trialability – refers to "the degree to which an innovation may be experimented with on a limited basis" (Rogers, 1995, pp.15–16). In this study, trialability refers to the degree to which mobile learning can be experimented with before it is adopted by teachers and students. Although some previous studies did not show that trialability had significant effects on lecturers' intentions to use technology (Joo et al., 2014), in this study perceived trialability was hypothesised to have a significant effect on lecturers' attitudes towards their current and future intentions to use m-learning.

The present research will examine whether faculty members are able to deliver selected portions of a course (a single lesson or unit) using mobile devices prior to developing a full course. In addition, trialability considers whether the faculty members are likely to accomplish some teaching functions (e.g., reporting grades, communication with students, accessing the internet, downloading and uploading materials, watching video lessons) by using mobile devices in support of their classes.

Extended Constructs

UTAUT is a relatively new theoretical framework and needs additional exploration to validate its findings and its robustness (Straub, 2009). Furthermore, it does not include

individual factors like resistance to change and social norms that may help to explain the technology acceptance and use of mobile devices. Due to the different contexts required for verifying UTAUT and TAM theories, as both were examined within an organisational environment here, the current research proposed that two external constructs would have a significant impact on faculty perceptions to adopt and use m-learning in Saudi higher education.

Resistance to Change (Huang et al., 2012) is considered in this study as, according to the literature, it is held to be the main obstacle to Saudi teachers adopting new styles of teaching. Resistance to change has been seen as an element that can affect faculty acceptance or resistance to the use of m-learning. In addition, many studies consider this factor to be a critical factor linked to the extent of users' acceptance of technology (Kim and Kankanhalli, 2009; Nov and Ye, 2008). In the context of this study, resistance to change is understood in terms of the degree of a lecturer's willingness to adopt mobile learning in her teaching practice. It is hypothesized that resistance to change has a strong negative influence on the educator's current and future adoption of m-learning.

Social Norms are the rules and standards of behaviour that are considered acceptable in a group or society (Sherif, 1936). Al-Jammal (2013) defined social norms as the agreed terms of an unwritten social system that consists of beliefs and ideas derived from the social group's ideology and heritage, and which also constitutes a system of social norms. Norms are cultural products (including values, customs, and traditions) that represent individuals' basic knowledge of what others do, and what others think they should do (Sherif, 1936). In the context of this study, perceived social norms refers to the degree to which the individual believes that social norms impact on the use of mobile devices for teaching and learning. This factor was constructed and added to the research model because the nation's culture is favourable towards adopting new technology. Culture is believed by many researchers to have a bearing on outcomes relating to the adoption of technology (Avgerou, 2000). Nevertheless, social norms differ from one nation to another, and what applies to one country may not necessarily apply to another.

There is a lack of both Western and non-Western literature focusing on the issue of social norms in relation to mobile learning for students and teachers in higher education contexts. However, some studies mention that Saudi social norms may affect mobile technological acceptance without giving any detail about their exact influence or the conditions under which they have an impact (Almarwani, 2011; Al-Shehri, 2013). Saudi Arabia provides a good example of a country with cultural traditions that differ significantly from those seen in Western cultures, and which may have a significant impact on the attitudes and subjective norms that influence behavioural intentions towards the use of technology (Baker et al., 2007). Several potential issues and concerns regarding Saudi social norms – the conservativeness of Saudi universities, the misuse of cameras on mobile devices, and women's privacy – were studied with regard to the adoption of m-learning in this research due to the limitations of extant research in this area, and social norms were hypothesised to have a significant negative impact on faculty members' current and future intentions to use m-learning.

Moreover, gender, age, academic position, teaching experience, and mobile usage skills were also hypothesised to moderate the effect of the seven constructs (performance expectancy, effort expectancy, social influence, facilitating conditions, perceived trialability, resistance to change, and social norms) on intentions to use and future usage. In addition, all the seven constructs were hypothesised to have a significant correlation and relationship between one another.

Current and Future Intention to Use Mobile Learning was exchanged with the behavioural intention to use mobile technology as m-learning is not obviously in use in KAU. Hence, this phrase means the faculty intention and willingness to use m-learning currently and to continue using it in the future. This main dependent variable – the current and future intention to use – was hypothesised to be significantly influenced by the seven constructs (listed above).

Numerous educational organisations currently use mobile technology to support instruction and learning in tertiary education. An investigation of the relationship between the current use of mobile technology and the future intention to use the technology might provide some insights concerning future designs for mobile

technology that would help to improve their adoption. In addition, the current and future intention to use mobile learning technology was assumed to be influenced by faculty members' personal characteristics (including gender, age, academic position, years of teaching experiences, and mobile device usage).

1.5 The Development of the Research Hypotheses

The research hypotheses were established from theory-based constructs, and explore the critical factors that affect acceptance or rejection of m-learning. "Research questions and hypotheses become 'signposts' for explaining the purpose of the study and guiding the research" (Creswell, 2008, p. 139). A hypothesis is a tentative explanation for specific phenomena about which the researcher has questions. Forming research hypotheses is well suited to model-based research, which involves testing certain variables or theories through hypotheses. As this research seeks to examine a number of factors that are anticipated to have an impact on faculty members' intentions to adopt m-learning in their professional practices, the use of research hypotheses is proposed to be the best way to approach the study and provide it with a good structural design. This requires converting the research questions into hypotheses that will aid in designing the quantitative instrument of the research, and the results of this instrument will, in turn, help to design the qualitative tool. Both methods will be used to test the validity of the hypotheses, to answer research questions, and to perform the research conclusion.

The theoretical framework for this research is based on the UTAUT, the DIT and the extended constructs. Using the literature, research questions, and the conceptual framework, the following null and alternative hypotheses were created:

The Main Research Question: How do Saudi social norms influence the adoption of mobile learning by faculty members in Saudi higher education, and is gender an important factor for its uptake within this constituency?

The Hypotheses are:

$H1_0$: Saudi social norms have no significant effect on the perceptions of faculty members regarding the use of mobile learning.

$H1_A$: Saudi social norms have a significant effect on the perceptions of faculty members regarding the use of mobile learning.

Also:

$H2_0$: The influence of Saudi social norms shows no statistically significant difference between male and female users of mobile learning.

$H2_A$: The influence of Saudi social norms shows a statistically significant difference between male and female users of mobile learning.

The First Research Question: In what ways are teachers currently using mobile learning with their students inside the classroom? How do teachers perceive the future of mobile learning?

It should be noted here that this research question was analysed descriptively in the quantitative phase and in an in-depth manner in the qualitative phase, as it sought to explore the current use of m-learning and how it could be successfully deployed in the future.

The Second Research Question: Which of the following dependent variables (if any) are significant predictors of the behavioural intention to use mobile learning: performance expectancy, effort expectancy, social influence, facilitating conditions, perceived trialability, Saudi social norms, and resistance to change?

The hypotheses are:

$H3_0$: Performance expectancy, effort expectancy, social influence, facilitating conditions, perceived trialability, perceived social norms, and resistance to change are not significant predictors of the behavioural intention to use mobile learning.

$H3_A$: Performance expectancy, effort expectancy, social influence, facilitating conditions, perceived trialability, perceived social norms, and resistance to change are significant predictors of the behavioural intention to use mobile learning.

In addition, the following sub-hypotheses were also proposed for examination:

$H4_0$: The performance expectancy of m-learning technology has no significant positive effect on current and future intentions to use m-learning.

$H4_A$: The performance expectancy of m-learning technology has a significant positive effect on current and future intentions to use m-learning.

$H5_0$: The effort expectancy of m-learning technology has no significant effect on current and future intentions to use m-learning.

$H5_A$: The effort expectancy of m-learning technology has a significant positive effect on current and future intentions to use m-learning.

$H6_0$: Social influence has no significant effect on current and future intentions to use m-learning.

$H6_A$: Social influence has a significant positive effect on current and future intentions to use m-learning.

$H7_0$: The facilitating conditions have no significant effect on current and future intentions to use m-learning.

$H7_A$: The facilitating conditions have a significant positive effect on current and future intentions to use m-learning.

$H8_0$: The perceived trialability of m-learning has no significant effect on current and future intentions to use m-learning.

$H8_A$: The perceived trialability of m-learning has a significant positive effect on current and future intentions to use m-learning.

$H9_0$: Resistance to changing traditional practices has no significant impact on the faculty members' perceptions regarding acceptance of m-learning with respect to current and future intentions to use m-learning.

$H9_A$: Resistance to changing traditional practices has a significant negative impact on the faculty members' perceptions regarding acceptance of m-learning with respect to current and future intentions to use m-learning.

The Third Research Question: Is there a statistically significant relationship between faculty members' personal characteristics (including gender, age, academic qualifications, academic position, years of teaching experience, mobile device usage) and their perceptions towards using mobile learning?

The following hypotheses needed testing:

$H10_0$: There is no statistically significant relationship between faculty members' personal characteristics (including gender, age, academic qualifications, academic position, years of teaching experience, mobile device usage) and their perceptions towards using mobile learning.

$H10_A$: There is a statistically significant relationship between faculty members' personal characteristics (including gender, age, academic qualifications, academic position, years of teaching experience, mobile device usage) and their perceptions towards using mobile learning.

In addition, this research was interested in observing any correlations between the model's factors, as well as between the factors and the demographic data. These are additional investigations that have rarely been explored in the literature. Thus, the following further hypotheses required testing:

$H11_0$: The seven constructs (performance expectancy, effort expectancy, social influence, facilitating conditions, perceived trialability, resistant to change, and social norms) are not mediated by faculty members' personal characteristics (including gender, age, years of teaching experience, academic position, mobile device usage).

$H11_A$: The seven constructs (performance expectancy, effort expectancy, social influence, facilitating conditions, perceived trialability, resistant to change, and social norms) are mediated by faculty members' personal characteristics (including gender, age, years of teaching experience, academic position, mobile device usage).

Also:

$H12_0$: There are no strong correlations between the seven constructs (performance expectancy, effort expectancy, social influence, facilitating conditions, perceived trialability, resistant to change, and social norms).

H12$_A$: There are strong correlations between the seven constructs (performance expectancy, effort expectancy, social influence, facilitating conditions, perceived trialability, resistant to change, and social norms).

1.6 Assumptions

The following assumptions have been made within this study:

- The research sample is assumed to be representative to include all age groups, faculty with different academic degrees and positions, and with a broad range of teaching experiences to ensure the reliability and to avoid bias.
- The faculty members are assumed to have understood and followed the instructions provided within the survey and the interview accurately.
- The faculty members are assumed to have responded to the survey and personal interview questions honestly.

1.7 Structure of the Thesis

This thesis is organised as follows. Chapter One provides the introduction, outlining the research problem, the purpose of the study, the research questions, the importance of the research, the research conceptual framework, and the research hypotheses. Chapter Two will then examine higher education and mobile learning in Saudi Arabia, and provide a review of the literature. The methodology and procedures used to conduct this study will be discussed in Chapter Three. In Chapter Four, the process used for collecting the quantitative data will be given together with its findings, and an analysis of these findings; whilst Chapter Five will discuss the process used for collecting the qualitative data, and present its findings together with an analysis of these findings. Chapter Six will provide a discussion of the quantitative findings, whilst Chapter Seven will present a discussion of the qualitative findings. Finally, Chapter Eight will summarise the research findings through answering the research questions, as well as discussing the research's implications and limitations, and presenting its recommendations.

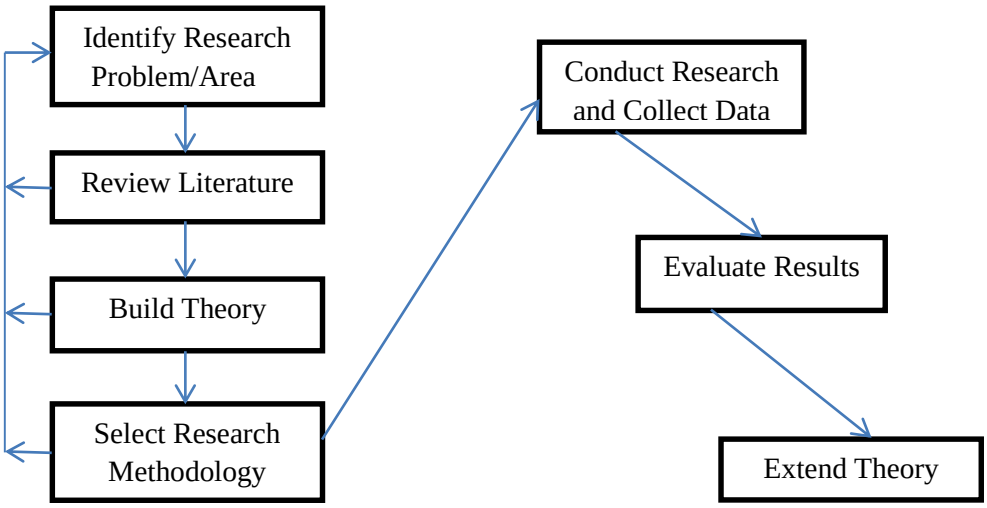

Figure 1.2: Phases in a research Process (Galliers and Land, 1988)

In order to build a well-established research design, Galliers and Land's (1988) research phases will be followed. Figure 1.2 in fact provided a starting point to think about the phases that may be included in the current research. However, a modification to Galliers and Land's research phases process was made to suit the needs of my research and to aid in accomplishing this study in the most effective way. This resulted in the model provided in Figure 1.3 below.

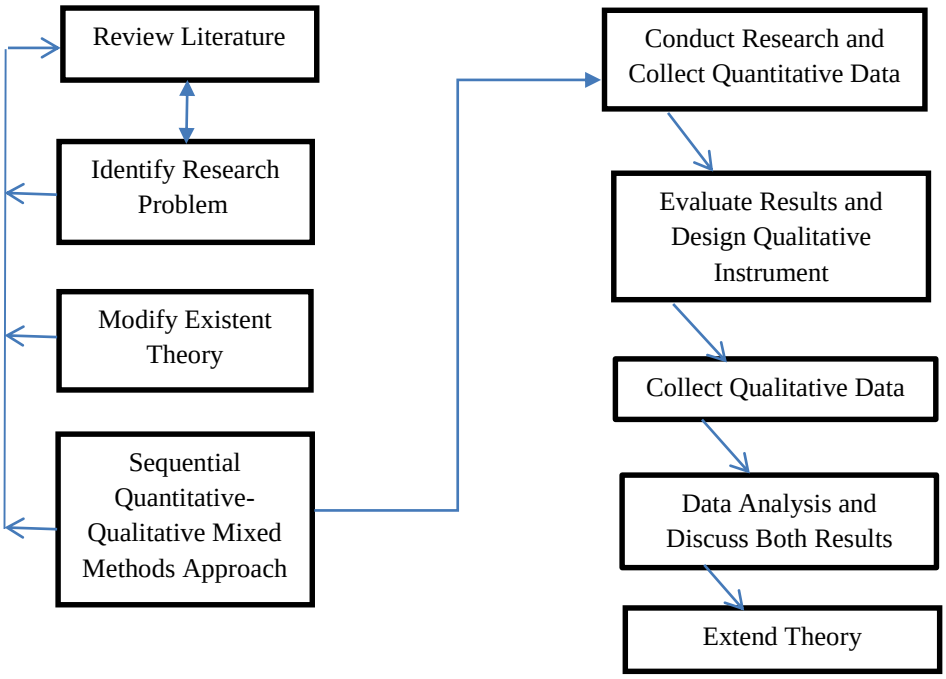

Figure 1.3: The Research Phases Process

The literature was reviewed and considered several times prior to determining the research problem in order to ensure that the hypothesised literature gap in previous studies existed. After this, the research phase process involved a feedback loop, moving between the literature and the research problem to investigate similar research and determine the theories that could be used to verify the research questions and hypotheses. In addition, the same process was conducted to decide on the research methodology that would be best suited to the research context. The Sequential Quantitative-Qualitative Mixed Methods Approach was chosen as the research methodology (Teddlie and Tashakkori, 2009). This means that quantitative research was conducted and analysed and then, based on the results of this phase, a qualitative part was designed, qualitative research conducted, and the results analysed. Finally, the discussion of both sets of findings was weaved through pooling both the quantitative and qualitative data.

1.8 Conclusion

This Chapter outlines the research problem that is considered to involve a spider web of issues that pose limitations to the development of education in Saudi universities. Earlier in this chapter I showed the need for this research and explained my motivations in carrying it out. I have discussed how teachers' pedagogical, technological, and cultural beliefs about incorporating technology within the educational context are the key factors for ensuring its successful integration. In addition, I presented the research questions and explained the significance of this study. A conceptual framework and research hypotheses were formulated. The next chapter provides the context of the study and illustrates the history of Saudi higher education in line with ICT development in the educational environment.

Chapter 2 : Literature Review

This chapter provides a brief overview of Saudi Arabia and examines how it is influenced by its culture and social norms. In addition, it discusses Saudi Arabia's higher education system in terms of the development of its universities, the Saudi culture, the status of students and faculty members, and the integration of ICT within higher education. It looks at the current provision of m-learning, together with the prospective benefits and challenges it could present for Saudi universities. In addition, this chapter considers extant studies on m-learning in higher education elsewhere, examining its benefits and the challenges it still faces. As this thesis focuses on identifying the factors that affect the adoption of m-learning by universities' faculty members, two theories regarding technological uptake will be presented and discussed.

2.1 The Context of the Study

Figure 2.1: A Map of the Kingdom of Saudi Arabia[2]

[2] Source of Image http://www.google.co.uk/

The Kingdom of Saudi Arabia (KSA) is the second-largest state in the Arab world, with a total area of 2,250,000 km^2 (868,730 square miles) and is located in Western Asia, constituting the bulk of the Arabian Peninsula (CDSI, 2014) (see Figure 2.1). Its capital city is Riyadh, which is located in Najd, in the middle of the Kingdom. Saudi Arabia has a total population of 30.7 million, of which 20.7 million are Saudi citizens. It is a monarchy headed by King Salman bin Abdulaziz Al Saud, Custodian of the Two Holy Mosques.

The Kingdom of Saudi Arabia was established in 1932 By Abdulaziz Al Saud. Since the discovery of oil in 1938, the Kingdom has developed rapidly and become the world's largest oil producer and exporter. Consequently, the country has transformed from an undeveloped nomadic state to a highly modern economic kingdom. As Saudi Arabia is the home of Islam, its culture is strongly influenced by religion, and the segregation of genders is required within many areas of life, including in school and university education (Alebaikan, 2010). Although most universities admit both genders, males and females attend separate campuses, and direct interaction between members of different genders is not allowed on campuses except in exceptional circumstances (ibid). Female lecturers teach only female students, although male lecturers are permitted to teach male and female students via closed-circuit TV.

2.1.1 Higher Education in Saudi Arabia

The number of students in higher education in Saudi Arabia has grown substantially over the past decade, and there has been a major development in both the quality and quantity of teaching provision (Borg and Alshumaimeri, 2012; Alshayea, 2012). In 1957, King Saud Bin Abdul Aziz University became the first university to be established in Saudi Arabia (Saudi Ministry of Higher Education, 2010), and since then the number of universities has increased from seven state universities in 1997 to 52 universities and colleges (including 24 government universities, 8 private universities and 20 private colleges), with a total of roughly 1,496,000 students in 2014 (MOE, 2014). The Saudi government has allocated a large budget to the ministry of education, recently investing around $57.9 billion in education, which represents twenty-five percent of the country's total appropriations (Ministry of Finance, 2015). Furthermore, education in Saudi Arabia is free, except within private institutions, and

every Saudi higher education student that studies in the government universities is paid a monthly allowance according to his or her subject of study, with Arts students receiving 850 Saudi Riyals (£150), and Science students receiving 1,000 Saudi Riyals (£177).

Most universities across the Kingdom have both male and female colleges, although a few universities admit males only, such as the University of Petroleum and Minerals in Dhahran and the Islamic University in Al-Madinah, whilst there are some that admit female students only, such as Princess Noura bint Abdulrahman University in Riyadh, and Effat University and Dar Al-Hekma University in Jeddah. It is worth mentioning here that although Princess Noura University was the first public female campus to be established (in 2008), Effat and Dar Al-Hekma University were the first private female universities (established in 1999).

The Saudi higher educational system has a development policy strategy that aims to enhance the education in the Kingdom. This strategy includes the development of scientific research in the arts and sciences, innovations in these fields in order to meet the requirements of technological global trends, and enforcement training services and inventive studies for postgrads that are in employment to improve their knowledge and skills. However, Al-Mengash's (2006) evaluation of this strategy found that it needs to be revisited and redeveloped, as some of the strategy's points are not successfully applied in the Saudi educational system, with the current teaching and learning process being centred on memorisation and thus lacking an emphasis on motivating critical thinking, reflection, and creativity. As globalisation has played a significant role in shaping competition in a variety of sectors, the conservative Kingdom of Saudi Arabia is seeking to re-consider its regional role in education, especially in higher education, which is seen to be where both 'the need and the solutions' are located (Denman and Hilal, 2011).

2.1.2 King Abdulaziz University

King Abdulaziz University (KAU), the case study site for this research, carries the name of the establisher of Saudi Arabia in 1967, and was initially a private university with a small number of students – 68 male and 30 female (KAU, 2015). The university then became a governmental institution in 1974 that provided higher education for the

western area of Saudi Arabia. The university underwent significant development in both the quality and quantity of its provision, becoming one of the largest and most distinguished universities in Saudi Arabia, with a total of 180,212 male and female students in 2014 (KAU, 2015). It is worth mentioning that KAU is also considered a pioneer in offering higher education to Saudi women, with both gender sections being founded in the same year.

The University provides face-to-face, distance, and online distance learning modes to facilitate the education for all student programmes and to cope with the development in learning and teaching technology (ibid). KAU has a long-term vision, which they aim to accomplish by 2020, and which includes five fundamental goals and aims:

- To be a World Class University with sustainability and community engagement.
- Developing standards of assessment for student performance.
- High-quality research and development programmes.
- Cultural contributions.
- To make optimal investment of university resources and capabilities (ibid).

In order to meet its vision, the university has a number of deans that support the faculty and students with several resources and training courses, such as the Centre for Teaching & Learning Development in KAU, which provides pedagogical, electronic and distance learning courses. In addition, it has a Deanship of Information Technology, which is responsible for improving the University's technical, administrative and instructional standards by providing the latest software, services, consultancies and technical studies for its educational, cultural, research and administrative sectors and, more importantly, for providing technical support across all the institution’s departments. Although King Abdulaziz University has recently provided its instructors with a new tool for e-learning – Blackboard – this is used for distance learners, but its use is not compulsory for campus-based students. In addition, there is no assessment and evaluation of the e-learning system’s effectiveness, nor are there any motivations or rewards given to educators to use this system.

2.1.3 Mobile Learning in Saudi Arabia

In the past five years, the mobile broadband sector has witnessed a large growth, with a proliferation and growing interest in smart devices and the launch of several projects to enhance networks services. The Kingdom of Saudi Arabia has featured one of the highest percentage increases in the world relating to the use of the internet through portable devices (CITC, 2015), which currently has the highest penetration of Mobile First users across all age groups are in the Middle East (Saudi Arabia, 11%) (CMO Council, 2015). The use of mobile devices is rapidly increasing in KSA, with the total number of mobile subscriptions reaching 51 million for a 30.7 million population in 2014, with a penetration rate of 169.3% (CITC, 2014). Mobile broadband has recently been pushed much more than fixed-line internet, whose access is restricted to work and home environments. Developments in mobile phone services and mobile telecommunications have shown a significant rise recently, opening up competition in the mobile communications market and leading to the development of technologies that offer a diverse range of services and competitive pricing (MCIT, 2012).

Recently, the Saudi government has developed many projects through the Ministry of Communications and Information Technology (MCIT) that seek to enhance the broadband infrastructure as a response to the increasing demand on the government's transformation to e- government, on the development of education, and given its urgent desire to keep up with the massive worldwide development in mobile technology. As a result of this development, the Saudi mobile market has expanded and become more competitive, offering users commercial bouquets with very reasonable prices for smart mobile devices and broadband connections. Hence, mobile technology has become more accessible and inexpensive than when it first appeared in 1996, at which time it was very expensive and only a few individuals could afford it. Although Saudi Arabia is experiencing a tremendous transformation of and uptake in internet services – with higher connection speeds being available for connected devices – internet connections on mobile phones are often quite poor, and sometimes unavailable, specifically in rural areas (Al-Mubarak, 2013). In addition, MCIT has ensured the adoption of computer and internet crimes regulation for securing the user's

privacy against abuse through initiating the preparation of the anti-cyber-crime law scheme (MCIT, 2015).

The demand for household internet networks has stretched significantly in Saudi Arabia in line with the society's desire for broadband services, particularly after the Saudi government funded many tech schemes that required the construction and enhancement of digital infrastructure to make all its services electronic. In line with this advancement, many Saudi government and banking services have exploited the technological advantages and initiatives provided by e-government transactions, and have made most of their services available online or through mobile apps, including 'Tadawul' (the stock exchange system) and 'Absher' the (e-services of Ministry of Interior). To ensure the successful utilisation of these apps, some researchers have volunteered to conduct surveys to determine user perceptions of using mobile-banking (Al-Jabri and Sohail, 2012; Hidayat-ur-Rehman, 2014) and the m-government system (Abanumy and Mayhew, 2005; Alotaibi, 2013; Alsenaidy and Ahmad, 2012), as well as to discover what factors influence Saudi users to adopt these services via portable devices. For example, Alotaibi (20113) conducted a study to determine the factors that impact on Saudi user acceptance of Tadawul utilising the UTAUT model. His survey results found that behavioural intentions towards the use of M-Tadawul were influenced by performance expectancy, effort expectancy, social influences and M-Tadawul features, and they were moderated by gender, age and education (ibid).

Smartphones and tablets have changed the way that Saudi residents live their daily lives, from their interactions with the government and other organisations to the way they engage in their education and in their social lives. The continued decline in the cost of portable devices is likely to lead to the increasing use of these devices in the next few years, as well as a growth in the mobile communication services market (CITC, 2015). This widespread use of mobile devices equipped with internet connections in the Saudi society encourages the increasing demand for mobile applications. As a result, accessing social apps via portable devices has become very popular. Nowadays, Saudi users are considered to be in the top ten worldwide with regards to the frequency at which they access and actively interact through mobile applications such as Twitter, Keek, Snapchat, Instagram, Facebook, and WhatsApp

(Al-Shehri, 2012). Forty-four per cent of worldwide keek users (keek is a video mobile software app) are from Saudi Arabia, and actively participate in watching and uploading social videos (ibid).

However, modern technology does not always fit with Saudi society, culture and traditions. As Al-Jammal (2013) observed in her study about the impact of the use of social networking on the formation of moral and ethical behaviours in Saudi youth, identities and values in Saudi society are affected by the social norms factor. Social norms mean the agreed terms of an unwritten social system that consists of beliefs and ideas derived from the social group's ideology and heritage, and which also constitutes a system of social norms (ibid). In the Saudi context, designing or initiating any technology must be a process that is undertaken with care, and particularly where a piece of technology is equipped with a camera.

The development of ICT and increased awareness of its importance synchronise with the rapid development of portable devices that are inexpensive in comparison to computers. In the global domain of education, many higher education institutions and universities seek to provide a high-level of quality teaching and learning that is integrated with ICT technology, and particularly mobile technology. Portable technology creates a modern mode of teaching and learning, called 'mobile learning'. Using mobile devices such as iPads, iPods, tablets, and smartphones could have a significant impact on students' learning and achievements (this issue will be discussed in detail in the following section). Locally, Saudi Arabia has experienced a vast development in the application of e-learning and distance education, which is one of the leading and most promising interventions in the Arab nation[3] (Al- Fahad, 2009). However, m-learning is still in its infancy, and is considered fertile ground for experience and development in Saudi higher education.

It is worth noting that King Abdulaziz University has its own MyKAU mobile application, which provides all the university stakeholders with anywhere/anytime access to the university portal and website through portable devices. It also offers

[3] For more information about this achievement, visit the Ministry of Higher Education at http://www.elc.edu.sa/.

several shared electronic services for both academic staff and students, such as course schedules, student information, system alerts, communication with teachers, support and communication, news and a university map, as well as some services that are just for the faculty, such as access to research and the Marz system (a system through which every faculty member can build and manage his/her own website) (KAU, 2011). However, these services are more concerned with facilitating educators' and students' administrative needs, and less about targeting the didactic process and the development of learning and teaching.

The following section illustrates the findings of previous studies regarding the use of mobile devices for the purpose of teaching and learning in higher education settings, as well as discussing the advantages and disadvantages of their use.

2.2 Mobile Learning, Benefits and Barriers

Mobile technology includes wireless laptops, mobile phones (such as Blackberries and iPhones), hand-held personal digital assistants (PDAs), and tablets (such as iPads) (Rajasingham, 2011), and Sharples (2004) defines mobile learning as "Learning away from one's normal learning environment or learning involving the use of mobile devices". Ozdemir (2010) describes mobile devices as technologies that are with us whenever and wherever we are. Mobile learning involves the two aspects of *learning* through mobile devices and the *mobility* of the learners (Traxler, 2007). Mobile learning does not merely mean the use of mobile technology for learning purposes, but also involves the translation of instructional theories into practice. The key features that distinguish the use of mobile devices in learning from the use of other e-learning modes are functionality, multimedia convergence, ubiquity, personal ownership, social interactivity, context sensitivity, location awareness, connectivity and personalisation (Cook, 2010).

Moreover, the property of mobility is combined with the learner rather than with specific technology, as technology is constantly developing and changing. Therefore, a comprehensive definition of mobile learning must focus on learning together with different pedagogical theories that can improve the learning modes used, either in the

presence of technology or without it. In relation to my research context, mobile learning means a learning mode that enables pedagogical theories to enhance learners' experiences and enable three-way interactive networks and communications between learners, instructors, and learning contents anytime and anywhere, and which is empowered through advanced mobile technology in on-line and off-line modes. This definition highlights the importance of two separate dimensions of mobile learning – its pedagogical role and the three-way collaborating networks that require an instructor's presence in this learning environment. Moreover, the core interests of this study concern the more fundamental issue of how to encourage teachers in Saudi Arabia to alter their pedagogical approaches to teaching and learning in order to exploit the potential of mobile devices.

The development of e-learning in higher education is an issue that receives a significant focus from higher education researchers and institutions in developed and developing countries alike. However, despite the widespread access to and use of ICT in education during previous decades, some developing countries are still suffering from the problem of a "digital divide" between them and more developed regions due to their poor infrastructure (ITU, 2011; Clothey, 2011; Sarkar, 2012). Although Saudi Arabia is considered to be a developed country from an economic perspective, its education sector is still considered to fit in the developing zone, with the Saudi higher education institution ranking lower than its peers in developed nations. The first appearance by an Arab university in the international league tables is King Abdullah University of Science & Technology in Thuwal at 294th place, followed by King Abdulaziz University in Jeddah at 378th place (US News, 2015). The question that arises here is why, despite the enormous resources and budget that the Saudi government spends on developing education in Saudi Arabia, the standard of education remains low. And what has led them to reach this low position amongst higher education institutions worldwide?

As indicated earlier in the research problem section (see §1.1), the lack of infrastructure in some Saudi universities and the use of traditional instruction in Saudi Arabia are considered the core factors that decrease the quality and slow the development of education. Furthermore, Alnahdi (2014) emphasised the lack of

accountability and quality assessment of teacher performance as problems for Saudi education. Overcoming these and others shortcomings may help in reducing the gap between Saudi universities and more developed higher education institutions, and Saudi institutions could do so by following the lead of higher ranked institutions whilst taking Saudi culture and norms into account. One of the successful innovations that industrial countries have made is the utilisation of mobile learning in universities settings.

As telecommunications and mobile devices have become more advanced and popular, they have provided increasingly rich resources for learners to use for mobile learning, as this technology enables learners to search for and access learning resources at anytime and anyplace (Cruz et al., 2012). In addition, the use of mobile devices in combination with wireless infrastructures in educational institutions increases the effectiveness of these devices as learning tools. The adoption of mobile learning within higher education has been suggested as a solution for the digital divide between developed and third world regions, as mobile phones are accessible to less and more wealthy people alike (ITU, 2009; Clothey, 2011). Students are seeking knowledge while on the move, and mobile learning has become commonly utilised among tertiary education institutions in developed countries as it provides access to educational materials anywhere and at anytime.

In addition, m-learning overcomes numerous limitations of traditional face-to-face education (Zhu et al., 2012). Taking into consideration the potential features of mobile devices, m-learning marks an important turning point for knowledge creation through active participation rather than passive learning (Messinger, 2012). The possibilities that mobile learning could provide for education have led many researchers to explore the benefits of what it can do that other learning approaches cannot. Although a great volume of projects on mobile learning in higher education are being undertaken globally, each project has its own goal(s) and different sets of factors that affect its implementation in its context. For example, in contrast to the present study, some of this research has focused on technology and mobile applications themselves instead of on pedagogical theories (Uther et al., 2005; Yi, 2010; Li and Qiu, 2011; Chen & Wei, 2012; Zheng et al., 2012), whilst other research has focused on mobile learning

philosophies and the various ways for enhancing the experiences of learners (Jeng, 2010; Collins, 2005; Chen and Chung, 2008; Kukulska-Hulme, & Shield, 2007; Kukulska-Hulme & Shield, 2008). Although perceptions about mobile learning still vary and no specific model fits all educational contexts, researchers can nonetheless provide models of learning experiences that demonstrate the opportunities that mobile learning can deliver for students in diverse learning environments and disciplines, in different places and at different times, whilst also tailoring them to their more specific contexts and needs.

Nowadays, most university students own portable devices that they use for both educational and non-educational purposes. The benefits of integrating mobile technologies in higher education for both learners and faculty members have been well documented in the extant literature, with the most cited ones being increasing student motivation and enjoyment of the learning process (Bakia et al., 2007, p. 9). The multiple functions of mobile phones provide opportunities for students to improve their learning styles (Rogers et al., 2010), for increased student engagement (Messinger, 2012), for making the learning process more interesting (Venkatesh et al., 2006), for improving academic performance (Akour, 2009; Messinger, 2012), and for allowing the construction of educational applications that enhance students' learning experiences (Wang et al., 2009; Ozdemir, 2010). Furthermore, students' abilities to use their own mobile devices can provide for flexible and convenient learning, as well as easy access to resources and learning materials (Calkins, 2009). Indeed, Mac Callum and Jeffrey (2013) argue that mobile learning offers a fundamental change in the way learning can be regarded and opens the door to countless uses for educational purposes.

The advancement of portable devices has facilitated a pedagogical revolution that supports multiple learning approaches, including constructivism (Chen et al., 2003; Uzunboylu et al., 2009; Zurita and Nussbaum, 2004), which assumes that learners construct their knowledge through interacting with their learning environments (Brown and Campione, 1996); problem-solving (Sánchez and Olivares, 2011; Sung et al., 2010), which allows for reflection and the development of knowledge through empirical methods (Motiwalla, 2007); situated learning (Lave and Wenger, 1991),

which assumes that learning is a process of social participation (Taylor et al., 2006); and collaborative learning approaches (Huang et al., 2010; Sánchez and Olivares, 2011; Sung et al., 2010), which facilitate communication and the sharing of information, all of which can benefit students in their learning journeys.

Hence, mobile learning initiatives and research should be carefully designed, and should be based on rigours theoretical pedagogies that consider previous successful interventions that have been made in developed countries. For instance, an experiment in MA Landscape Studies at the University of Sheffield in the UK explored the context of mobile device mediated problem-solving and enabled collaboration in which learners generated their own Augmented Contexts for Development (ACD), and grounded the theoretical basis of the research on extending Vygotsky's account of adult learning (for further detail, see Cook, 2010). In addition, a study conducted at the University of Leeds by Morris et al. (2012) to explore the utilisation of iPads by undergraduate sciences students in their learning found that the students used their tablets extensively to retrieve information, record lectures, and access learning resources. However, they were only familiar with Web 2.0 technologies, which led to the researchers' recommendation that the institution encouraged students to use new Web 2.0 technologies.

Mueller and her colleagues (2012) conducted a study on the use of BlackBerry® devices for learning in a graduate-level business programme guided by instructors. The device was mainly used for communication purposes outside the classroom through various applications. In addition, other applications were used for learning purposes (e.g. calendar, email, browser, documents to go, Chalk Mobile, Desire2Learn 2Go, and Bloomberg Mobile) to encourage academic use both inside and outside educational spaces. These students perceived mobile learning to be easy to use, to be a powerful learning tool, to support self-directed learning, to be applicable to formal and informal learning, and to be accessible inside and outside of their classrooms. The students indicated that they frequently used the tool for communication, such as organising group-work tasks. Moreover, the learners developed a communication channel through an unintended social support system, which was essential for stimulating engagement beyond in-class interactions.

However, the study revealed that the Blackberry's use for classroom learning was more limited than its student-directed use inside and outside the classroom. This limitation could be addressed by a broad investigation of mobile learning pedagogy that could potentially support self-directed learning. Although mobile learning was put to some positive use in this study, the instructors' perceptions regarding the pedagogical applications of it were significant for understanding its limited use, such as that mobile learning was irrelevant for the face-to-face group activities within the in-class teaching activities in the business programme (Mueller et al., 2012). The authors emphasised the importance of undertaking further examinations into instructors' pedagogical decisions regarding the utilisation of mobile learning within the classroom.

Mobile learning also has benefits for educators, with research showing that where teachers take the initiative in implementing it, it allows the identification of effective mobile educational environments and strategic approaches that enhance teaching. This means that educational materials are available through a variety of different media, and teachers are satisfied with the responses they receive from meeting the diverse needs of students (Calkins, 2009). Kearney and his colleagues (2012) studied the impact of iPad devices on learning and teaching at Longfield Academy, Kent. Their research found a significant and very positive impact on learning, as well as significant and still developing changes in pedagogy. The majority of learners were very positive about mobile learning and its impact on their inspiration, research skills, engagement and collaboration, while staff increasingly viewed the educational apps offered by it to be beneficial for them. Although some technical concerns were acknowledged, these were dealt with through sound project management. The findings of this study validate the value of mobile devices as learning tools.

Herrington et al. (2009) assessed postgraduate students' aptitudes for improving pedagogical approaches for mobile learning in constructivist learning environments in an introductory postgraduate subject on ICT in education. The research outcomes showed that the affordances of mobile learning can be inserted into activities that engage mobile students' learning. In addition, mobile learning was found to be suitable

for tasks that contain connectedness with other technologies, such as web 2.0 and learning management systems.

Brown (2009) conducted a study on undergraduate students' experiences using iPods for mobile learning in visual arts education. Students were asked to improve, implement and assess sequences of knowledge experiences that exploited the potential of mobile technology by embedding them into a mobile learning experience. Students were asked to provide peer assessments of each other's tasks, and were required to use an external site to demonstrate their work and to complete sets of tasks. The study showed that mobile learning could provide motivating and engaging experiences for the learner.

Despite the global trend toward m-learning, some educators are still resistant to integrating this technology into their practice, mainly because of the various challenges it presents for them. For example, Cruz et al. (2012) evaluated mobile applications in HE and aimed to understand teachers' perceptions of the opportunities and obstacles presented by mobile technologies. Their study showed that a lack of perceived learning values and institutional infrastructures hindered the realization of m-learning in HE. In addition, despite the fact that participants perceived m-learning to have the capacity to enhance communication with students and the resources and speed of feedback available to them, they identified technological, institutional, pedagogical and individual obstacles to using m-learning in academic contexts. The size of the screen and interface on mobile devices were perceived as technological obstacles; infrastructure, lack of support and institutional policies were perceived as institutional obstacles; and the pedagogical obstacles that influenced teachers' use of m-learning included information overload, scepticism from students and teachers, and learning impact. It concluded that even though mobile learning practices have been implemented broadly in higher education, it seems that m-learning should bring educational practices that ensure collaboration and meaningful learning is adopted.

In addition, Messinger's (2011) thesis highlighted a number of barriers that have affected the widespread adoption of mobile learning, including:

1. the distractions that the devices can create within a traditional classroom,

2. a lack of empirical evidence on m-learning's effective classroom use to increase the likelihood that other teachers may be in favour of using mobile devices in their own classrooms,
3. the lack of effective design of mobile technologies to meet the needs of learning styles of the 21st-century learner, and
4. the resistance of teachers to educational innovations.

Regardless of the disadvantages of m-learning, teachers and educational institutions need to encourage students to use PDAs or smart phones to enhance their knowledge and learning styles to meet the demands of today's and tomorrow's worlds (Hamilton, 2008). With the use of mobile technology expected to continue to increase, the nature of learning and teaching is undergoing ongoing changes, with instructors needing to make use of the possibilities of mobile technology to deliver education (Messinger, 2012). These changes are crucial to respond to changing learners' expectations and experiences as "digital natives" living in the information age (Prensky, 2001, 2009; Kukulska-Hulme and Jones, 2011). As developed nations are shifting from industrial societies to knowledge societies, the perceptions of teachers and educational institutions towards digital technology and how to use it in dealing with knowledge (Lai, 2011) are important in preparing "digital learners" to meet the requirements of the knowledge society, and this represents a major challenge for educational institutions and teachers alike (Lai, Khaddage and Knezek, 2011). Universities are seeking to discover and use new technologies (such as mobile devices) in ways that meet the desires and capabilities of both students and faculty members (Calkins, 2009).

2.3 Technology Adoption in Education

The user's adoption and evaluation of information technology is an issue of interest to both practitioners and researchers as it helps in improving the design of new technology, as well as predicting what technology will be used in the future. Moreover, technology adoption research can show why users are keen to adopt particular information systems while being unwilling to use other technologies through applying social decision-making theories and models to different individuals. Innovation

research hypothesizes that diverse results are useful in understanding technology acceptance for the initial and continuing use of technological innovations (Rogers, 2003). The initial use of technological innovations may not be sufficient to confirm the usability and longevity of a system, as users sometimes need to practice using an innovation on a regular basis (Rogers, 2003). Accordingly, this study intends to discern what factors affect faculty members' initial and future use of mobile technology.

According to Straub (2009, p.626) "technology adoption is (a) a complex, inherently social, developmental process; (b) individuals construct unique (but malleable) perceptions of technology that influence the adoption process; and (c) successfully facilitating a technology adoption needs to address cognitive, emotional, and contextual concerns". Furthermore, Dillon and Morris (1996, p.4) define 'user acceptance' as "the demonstrable willingness within a user group to employ information technology for the tasks it is designed to support". Hence, in this study, user acceptance is understood in terms of the willingness of faculty members to use their mobile devices in their learning and teaching practices, together with the ideal use to which the technology that students currently have can be put within their learning. Thus, 'user acceptance of technology' refers to the *evidence-based* use of that technology for the purposes that its designers intended it to be used.

Obviously, user resistance is a significant impediment to the success of information technology (Rasimah et al., 2011). Therefore, user acceptance is considered to be a pivotal factor in determining the success or failure of any design and application of information technology (Wang et al., 2009). In order to get a fuller understanding of the acceptance theory and develop this research's hypothesis, multiple theories need to be considered – the Diffusion of Innovation Theory (DIT) (Rogers, 2003), TAM (Davis, 1986), TAM2 (Venkatesh and Davis, 2000), TAM3 (Venkatesh and Bala, 2008), and the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003). Not all of these theories are used here, and some will be combined on the basis of the research questions and the needs of the study. After reviewing these theories, I will explain the reasons for selecting the ones to use in my thesis. I will now examine these theories in turn.

2.3.1 The Diffusion of Innovation Theory

In order to develop a deeper understanding of the acceptance theory, it is first necessary to understand the theoretical analysis of innovation diffusion. Rogers (2003, p.10) defined diffusion as "the process by which an innovation is communicated through certain channels over time among the members of a social system". The four key elements in the diffusion method are innovation, communication channels, time, and the relevant social system (Rogers, 2003, p.5). Rogers (2003, p.11) defined innovation as "an idea, practice or object that is perceived as new by an individual or other unit of adoption". The *innovation* in the current study refers to mobile technology, and *diffusion* is the degree to which mobile learning has been adopted by the faculty members.

Rogers (2003) outlined four essential elements of diffusion: innovation (the idea or practice that is the focus of the adoption), time (the acceptance rate of the innovation over time), communication channels (how the innovation is introduced), and social systems (the individuals, groups, or organisations that are involved in the innovation adoption and their impact on each other). He emphasised the need to understand the factors that influence the dissemination of innovative educational technologies through the use of the diffusion of innovation theory in order to help designers and researchers identify whether instructional products or practices have been adopted or not (ibid). If they are adopted, this is evidence that technology is acceptable, and if not, the users' reluctance must be detected and analysed (ibid).

2.3.1.1 Attributes of Innovation

Rogers (1995, pp.15–16) identified five characteristics of innovation that influence users' adoption of it: *relative advantage* "the degree to which an innovation is perceived as being better than the idea it supersedes"; *compatibility* "the degree to which an innovation is perceived as being consistent with the existing values, past experiences, and needs of potential adopters"; *complexity* "the degree to which an innovation is perceived as difficult to understand and use"; *trialability* "the degree to which an innovation may be experimented with on a limited basis"; and *observability* "the degree to which the results of an innovation are visible to others". Rogers (1995,

p.167) claimed that individuals' perceptions of these elements forecasts the level of adoption of the innovation. According to him, the extent to which technology affords advantages, is compatible with existing practices, has a low level of complexity, is potentially trialable, and is observable is sufficient to predict the rate of innovation diffusion (ibid). For Rogers, these five factors are associated with each other, but are nevertheless different in meaning (ibid).

The decision to adopt or reject technology is not an instant one, but a process consisting of several events for which an individual requires time to form a concrete decision. In relation to this research, relative advantage is hypothesised to be the key predictor of faculty members' adoption of m-learning. This factor can be measured by using several aspects, including social prestige, convenience, experiences, economic terms, and satisfaction (Alhawiti, 2011). Rogers (2003) clarified that an innovation's relative advantage is positively correlated to the rate of its adoption. Thus, the greater the relative advantage of m-learning, the greater the adoption of the innovation will be.

The important question to answer is thus whether faculty members view m-learning and the mobile technology it uses to be better than the current practices they use in their current teaching (traditional face-to-face education). In Saudi education in general, teachers are shaped through traditional didactic practices that are used from the start of primary school through to university-level education, so they continue to utilise the same practices and approaches that their teachers adopted in teaching their students (Alshayea, 2012), with few teachers being willing to change in the presence of modern technologies (Alebaikan, 2010). According to MacKeogh and Fox (2008), many educators in tertiary education still prefer old-fashioned lectures. Thus, resistance to change is an additional construct that might influence m-learning adoption, which suggests that university teachers could adopt m-learning if they perceived mobile technology to be *compatible* with the values of the educational system. Faculty members are unlikely to use *complex* items of mobile technology as tools for delivering teaching and learning. According to Rogers (2003), simple new practices are adopted more swiftly than those that require developing new skills, with

less complex m-learning and mobile devices being viewed more positively by faculty members as prospective elements to integrate into their learning and teaching.

Adapting to m-learning also requires the teaching provider to conceive this form of learning as *compatible* with their sociocultural values and beliefs and previously introduced ideas, and the potential adopter needs to view the innovation as necessary. *Trialability* helps in this transition, being positively correlated to the adoption of new technology. Having the opportunity to try out the relevant mobile technology would enable faculty members to understand how it would work in the faculty environment and to thus see its benefits first-hand. Finally, if faculty members in higher education institutions were provided with an opportunity to observe the results of using m-learning, this would increase the likelihood of their adopting it, as the perceived *observability* of m-learning is positively correlated to its projected rate of adoption.

Hence, Rogers' (2003) diffusion of innovation theory (DIT) is an appropriate tool to adopt for the purpose of assessing faculty perceptions on the attributes and barriers of m-learning, and hence to uncover what impacts on its adoption within Saudi universities. In addition to the characteristics impacting on the adoption of innovations provided under DIT, barriers to m-learning such as technical expertise, infrastructure, and faculty members' resistance to change their traditional teaching practices also need to be considered.

2.3.2 The Technology Acceptance Model (TAM)

Davis' (1986) technology acceptance model (TAM) has been used and modified by numerous scholars for explaining user acceptance of specific technologies (Bennett et al., 2011; Jairak, 2009; Park, 2012; Teo, 2009; Wang et al., 2008; Zhu, 2012). The main objective of TAM is to provide an explanation of the user acceptance of technology. TAM depends on two factors: perceived usefulness and perceived ease of use (Davis et al, 1989), which are used to predict user behavioural intentions towards using information technology (see figure 2.2). These two factors are similar to Rogers' (2003) factors in the DIT, which are relative advantage and compatibility respectively.

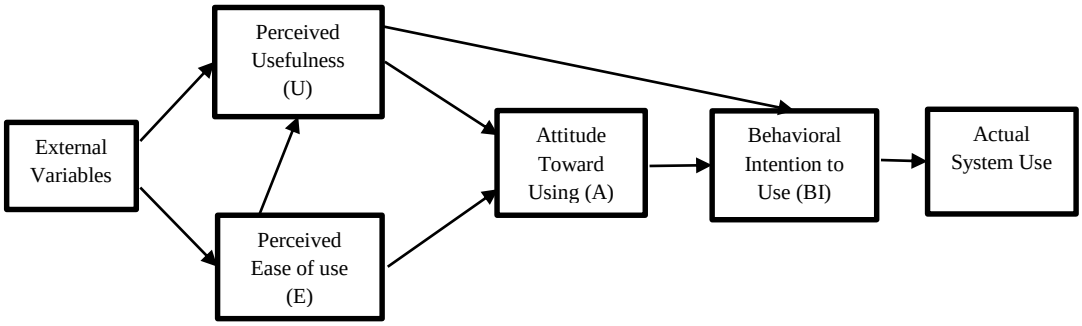

Figure 2.2: The Technology Acceptance Model (Davis, 1989)

Gillenson, and Sherrell (2002) used TAM and DIT within a business context in order to explore user behaviour within e-Commerce, and the results confirmed that TAM and DIT explained and predicted consumer behaviour accurately, and also that these two theories reconfirmed each other's outcomes, which in turn supports their validity and reliability (ibid). Recently, Son and his colleagues (2012) conducted research investigating the factors that influence the successful implementation of mobile computing devices in the construction industry by using the technology acceptance model (TAM). They concluded that user satisfaction was a significant component in their implementation, and that their choices are affected by individuals' philosophies about the usefulness of these tools rather than their views about their ease of use. Moreover, this research explored the factors that determine conceptions of usefulness (such as social influence, job importance, management support), as well as determinants of perceived ease of use (such as training and technological complexity), and found that these were critical factors that influence the adoption of mobile computing devices. However, the different factors that may be relevant between organisational contexts and educational ones mean that these findings will not necessarily be duplicated for educational contexts.

Im, Kim and Han (2008) also used TAM to explore the addition of two new moderators in higher education – perceived risk (PR) and technology type (TT) – which are mediated by experience and gender. They concluded that PR, TT and gender were found to be substantial predictors of the adoption of new technologies. Later,

Akour (2009) thesis explored the factors that impact on higher education students' perceptions on accepting and using m-learning. He extended TAM by adding factors such as student readiness, ease of access, quality of service, extrinsic influence, and university commitment. The results showed that all these constructs have a positive indirect relationship with behavioural intentions and the acceptance of m-learning through the two TAM constructs – usefulness and ease of use. Recently, MacCallum et al. (2014) studied factors that influence lecturers' acceptance of mobile learning by utilising and modifying TAM, and found that perceived usefulness, perceived ease of use, digital literacy, and teaching self-efficacy impact significantly on lecturers' adoption of m-learning.

Critiques of TAM and DIT have suggested that both models have strong limitations. Following an analysis of twenty-two published papers from 1980 to 2001, Legris et al. (2003) concluded that TAM was a useful model. However, they also suggested that it be integrated into a broader model. Moreover, some critiques have found DIT to be lacking in predictive power, and argued that it provides an overly simplified model of a complex reality (Rogers, 2003). As TAM was limited to only two key determinants, the theory was developed and extended in relation to the technology that it is applied to. TAM2, TAM3 and UTAUT are modifications for helping to understand the factors that influence user acceptance in different settings.

2.3.2.1 TAM2 and TAM3

Venkatesh and Davis (2000) developed the TAM model by defining the elements – including subjective norms, images, experiences, output qualities, computer self-efficacy, and computer anxiety – as ones that can influence perceived usefulness and perceived ease of use. Later, Venkatesh and Bala (2008) developed another extension of TAM by focussing on the backgrounds to perceived ease of use, adding two additional categories to the TAM2 model: Adjustments and Anchors. This has become known as TAM3. However, TAM3 theory is not considered in this thesis, and the only study to have examined it so far was conducted on a non-academic organisation (Venkatesh and Bala, 2008).

Zhu et al. (2012) designed a TAM model for mobile learning that consists of several external variables – perceived mobility value, perceived enjoyment (proved by Huang, Lin and Chuang, 2007), perceived output quality, prior experience (derived from TAM2 and TAM3), and perceived social interaction value (which has been tested in other areas) – that are used to examine external factors in relation to students' attitudes and acceptance of mobile learning. They concluded that students have a generally positive attitude towards mobile learning, but do not have a strong willingness to accept it. In addition, mobile devices, as learning instruments, are perceived to be easier to use than they are to be useful as a means for learning purposes (Zhu et al., 2012). The proposed TAM model can predict what factors are affecting students' adoption of m-learning (ibid).

TAM and TAM2 assume that users have access to information systems (Marshall, 2008). However, the access that the university lecturers in this study had to mobile devices for use in teaching and learning was contingent upon their ability to afford these devices and to allocate time for self-training. Marshall (2008) suggests that TAM and TAM2 fail to address obstacles to the usage of information systems, which is relevant to this study as the faculty members' lack of familiarity with using mobile devices may have had a negative impact on their acceptance of mobile technology for use in learning and teaching. In addition, the current usage of mobile learning in King Abdulaziz University was not initially clear and, regardless of its use, m-learning is voluntary. Hence, some of the above factors may be not suitable for this research.

2.3.3 The Unified Theory of Acceptance and Use of Technology Model (UTAUT)

Venkatesh, Morris, Davis and Davis (2003) created the Unified Theory of Acceptance and Use of Technology (UTAUT), identifying the four constructs of performance expectancy, effort expectancy, social influence, and facilitating conditions as factors that affect intention to use and usage behaviour (Figure 2.3). Venkatesh et al. (2003) suggest that gender, age, experience, and voluntariness of use moderate the impact of the four key constructs on usage intention and behaviour. This group of researchers reached their conclusions after studying eight combined theories for the acceptance

and use of information technology, including (1) the Theory of Reasoned Action (TRA), (2) the Technology Acceptance Model (TAM), (3) the Motivational Model (MM), (4) the Theory of Planned Behaviour (TPB), (5) the Combined Technology Acceptance Model and Theory of Planned Behaviour (C-TAM-TPB), (6) the Model of PC Utilisation (MPCU), (7) the Innovation Diffusion Theory (IDT), and (8) Social Cognitive Theory (SCT) (for more information see Venkatesh et al., 2003). In testing UTAUT, a survey by Venkatesh et al. (2003) found that the model clarifies 70% of the variance in user intentions to use information technology.

Recently, a number of studies have utilised Venkatesh et al.'s (2003) UTAUT to examine the acceptance of specific pieces of technology. Table 2.1 illustrates the literature that examines either faculty or students perceptions about adopting and using information technology in higher education. In addition, a significant body of research has studied the factors that influence students' acceptance and usage of mobile learning (Cheon et al., 2012; El-Gayar & Moran, 2006; Jairak et al., 2009; Mac Callum & Jeffrey, 2013; Nassuora, 2012; Thomas et al., 2013). However, only a small number of studies have investigated teachers' perspectives in relation to factors that impact upon their adoption of m-learning in higher educational contexts (Akour, 2009; MacCallum et al., 2014) and in high school settings (Ifenthaler & Schweinbenz, 2013; Messinger, 2011). Despite the differences in the perceptions between students and teachers regarding mobile learning acceptance, and because of the lack of research on the reasons for the faculty members' dispositions to adopt it, both the literature in relation to students' and teachers' acceptance of m-learning will be included in the current study.

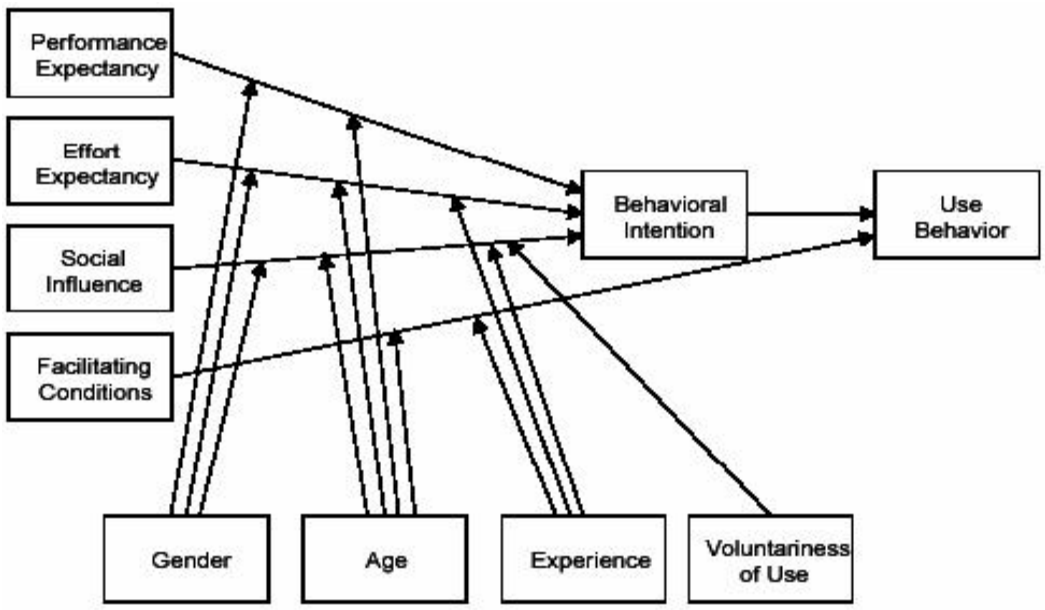

Figure 2.3: The UTUAT Model (Venkatesh et al., 2003)

Anderson, Schwager and Kerns (2006) examined faculty acceptance of Tablet PCs in the College of Business. They determined that UTAUT was largely validated in this setting, and explained 44.6% of the variance in usage of Tablet PCs. They discovered that within the business faculty environment, performance expectancy and voluntariness were the most important factors in determining acceptance. The TAM, UTAUT and DIT theories have been used by numerous studies seeking to determine why specific technologies are adopted. For example, Lu, Yu, Liu, and Yao (2003) examined the factors influencing user acceptance of wireless internet mobile devices (WIMD). They developed a conceptual framework within which individual differences, technological complexity, facilitating conditions, social influences, and the wireless trust environment were the key factors influencing the acceptance of this technology (Lu et al., 2003). Table 2.1 below presents summary of some studies that utilised UTAUT in higher education.

Author(s)	The targeted sample	The purpose of the study	The constructs	The results
Venkatesh, Morris, Davis, and Davis (2003)	Data from four organizations over a six-month period	To examine the factors that impact on the adoption of new technology in an organisation.	UTAUT constructs which are: Performance Expectancy PE, Effort Expectancy EE, Social Influence SI, and Facilitating Conditions FC.	UTAUT provides a useful tool for managers needing to assess the success of introductions of new technology and helps them to understand the drivers of acceptance.
Anderson, Schwager and Kerns (2006)	50 College of Business faculty members.	To examine faculty acceptance of Tablet PCs	UTAUT constructs	Performance expectancy and voluntariness were the most important factors in determining acceptance.

MacCallum, Jeffrey, and Kinshuk (2014)	175 University's teachers	To study the factors that determine the acceptance of mobile technology by lecturers.	Perceived usefulness, perceived ease of use, digital literacy, ICT anxiety, and ICT teaching self-efficacy.	Perceived usefulness, perceived ease of use, digital literacy, and teaching self-efficacy impacted significantly on the lecturers' adoption of m-learning.
Wang, Wu and Wang (2009)	330 students in Taiwan	To investigate the determinants of m-learning acceptance.	Performance Expectancy, Effort Expectancy, Social Influence, perceived playfulness (PP), and self-management of learning (SML).	PE, EE, SI, PP and SML were all significant determinants of BI to use m-learning. Age moderated the effects of EE and SI, and gender moderated the effects of SI and SML on m-learning use intention.
Jairak, Praneetpolgrang, and Mekhabunchakij (2009)	390 higher education students in Thailand	To study the main factors that impact on the acceptance of m-learning.	UTAUT model	PE and EE have a high level of acceptance.

Thomas, Singh, and Gaffar (2013)	322 students in the University of Guyana	To study the impacts of UTAUT factors on behavioural intentions to adopt mobile learning in higher education.	UTAUT model	Culture and country-level differences moderate the UTAUT's effects
Marchewka, Liu and Kostiwa (2007)	132 higher education students in the U.S.	To instigate student perceptions on using the Blackboard application in higher education.	UTAUT constructs, self-efficacy, and anxiety	The results did not provide strong support for the UTAUT model.
Donaldson (2011)	309 university students in the U.S.	To test the determinants of behavioural intentions to use mobile learning.	UTAUT constructs, playfulness of learning, voluntariness, and self-management	PE, SI, perceived playfulness of learning, and voluntariness of use were all significant determinants of BI to use m-learning.
Nassuora (2012)	80 higher education students in Saudi Arabia	To study the factors that impact on the acceptance of mobile learning.	UTAUT constructs	All factors had a positive relationship with behavioural intention to use m-learning.

El-Gayar & Moran (2006)	263 higher education students in the U.S.	To evaluate students' acceptance of Tablet PCs.	UTAUT constructs + Self-efficacy, anxiety.	PE, EE, and self-efficacy affect the behavioural intent. SI has no effect.
Michail, Giannakos and Vlamos (2011)	A survey of 176 webcast based learners	To clarify the effect of webcast duration into learners' intention to adopt webcasts for learning.	UTAUT constructs + Computer Self-Efficacy +	Webcast durations have significantly higher levels of behavioural intentions to use it. SI and PE are influenced by Webcast duration.
Rahman, Jamaludin and Mahmud (2011)	534 Postgraduate Students in Malaysia	To explore factors that influence the intention of students to use a digital library utilising a modified UTAUT model.	Performance expectancy, effort expectancy, information quality IQ, and service quality SQ	PE, EE and IQ are positively related to the BI to use the digital library, SQ is negatively related to the BI to use the digital library.
Shengli Deng, Yong Liu and Yuanyuan Qi (2011)	169 students in China	To study the determinants of web based question-	UTAUT constructs	PE and EE are significant predictors of the BI to use WBQAS. BI, and FC significantly

		answer services adoption using UTAUT.		influences the use of WBQAS. SI has no significant impact on the BI.
Pynoo, Devolder, Tondeur, Van Braak, Duyck and Duyck (2011)	72 secondary school teachers in Belgium	To explore teachers' acceptance and use of a digital learning environment (DLE).	UTAUT constructs	PE and SI influence the use the DLE. EE and FC are of less importance.
Cheng, Yu, Huang, Yu and Yu (2011)	264 employees in Taiwan	To investigate the influence of UTAUT constructs on the BI and whether they are moderated by gender, age or occupation.	Performance Expectancy, Effort Expectancy, and Social Influence	SI has a positive effect on BI to use m-learning, and the influence is higher in young females than their male counterparts.
My study [Exploring the Influences on Faculty Members' Adoption of Mobile Learning Technology	279 Faculty members in SA	To explore the influence of extended UTAUT constructs on the faculty members' current and future use of mobile	UTAUT constructs, Trialability, Resistance to Change, Social Norms	All constructs were statistically significant, and social norms, facilitating conditions, and perceived trialability were found to be significant predictors of their

at King Abdulaziz University, Saudi Arabia]		learning and whether they are moderated by gender, age, academic position, teaching experience and mobile usage skills in higher education.		behavioural intentions. This was moderated only by their skills in using mobile devices.

Table 2.1: The Previous Literature in the Field of Mobile Learning Adoption Based on the UTAUT

Through theoretical criticism of this study, Rogers (2003) used innovativeness, operationalised as 'time of adoption', to analyse the factors that influenced individuals' adoption of pieces of technology. Agarwal and Prasad (1998) criticised Rogers' (1962) definition of a theoretical concept in operational terms for showing a lack of diversity in its research methodology. They presented evidence that there are clear limitations on the description of behaviour that can be used as a predictor, and argued that there are no tools to evaluate the reliability and validity of the theory. They then offered what they took to be an improved conceptual framework for personal innovativeness in the domain of IT, which was theoretically defined as the willingness of an individual to try out any new information technology with the aim of demonstrating the relationship between users' perceptions about information technology and their intention to use it (Agarwal and Prasad, 1998).

Despite the criticisms, Venkatesh et al. (2003) integrated the elements of TAM, DIT, and six other prominent acceptance models to formulate the unified theory of acceptance and use of technology (UTAUT). UTAUT sets out to integrate the fragmented theory and research on individual acceptance of information technology into a unified theoretical model that has been found to outperform each of the individual models (Venkatesh et al., 2003). In contrast with UTAUT, TAM does not consider system variables that may negatively influence individuals' acceptance of information technology, such as system characteristics, training, and management support (Handy et al., 2001). UTAUT addresses many of these variables, including social influence, facilitating conditions, experience, and voluntariness. Furthermore, Van Biljon (2006) states that facilitating infrastructure and social and cultural factors play no role in TAM, unlike in UTAUT, where facilitating infrastructure is an important construct. However, neither theory considered the community norms and traditions, which appear in my study to have significant negative influence on Saudi faculty members' intentions to adopt and use m-learning in higher educational contexts. Hence, modifying and extending UTAUT is a demand of this current study.

In drawing upon these well-established acceptance models (DIT, TAM, and UTAUT), the present study aims to avoid repetition arising from overlaps between them in generating a better understanding of lecturers current use of m-learning and their

future intentions to use it. For example, the earlier acceptance theories examined user intentions to use and behavioural intentions to use the existing technology. However, in relation to my research context, it is not clear whether mobile learning is currently in use or not. Hence, the category of behavioural intention to use was dropped, as it is intended as a predictor of use, and was replaced with current and future intentions to use.

Furthermore, I ignore perceived ease of use (TAM/TAM2) and complexity (DIT) constructs as they are too similar to effort expectancy, perceived usefulness (TAM/TAM2) and relative advantage (DIT), as they have strong similarities to performance expectancy in UTAUT. Social influence is similar to compatibility (IDT). However, facilitating conditions were invented by UTAUT to consider the environment and infrastructure for the technology (Venkatesh, et al., 2003; Rogers, 2003). Besides, it is clear that the use of mobile learning in KAU is mostly voluntary. Hence, for this thesis, the factor of 'voluntariness' was dropped.

Based on an initial analysis of previous studies, a conceptual framework for exploring factors that influence faculty members' acceptance of or resistance to mobile learning was established. This study integrates the UTAUT's four factors: performance expectancy, effort expectancy, social influence and facilitating conditions (Venkatesh et al., 2003), as well as perceived trialability derived from DIT (Rogers, 1995), and two further factors – resistance to change (derived from Huang et al., 2012) and social norms (invented by this study). A conceptual framework is proposed and designed to address these constructs, which involves measuring the current adoption and use of mobile learning by the faculty staff – considering factors that affect the acceptance or resistance of faculty staff that will be tested in this study. This framework is shown in Figure 1.1.

2.4 Conclusion

This chapter has drawn a picture of the research context of Saudi Arabia in relation to the population, its growth, and its educational provision. In addition, it has discussed the progress of Saudi Arabia higher education, drawing attention to the history of

university growth, the role of technology in the advancement of higher education, and the attributes and challenges of integrating ICT within Saudi institutional settings.

In addition, the features of Saudi culture and norms were introduced in relation to the educational contexts that are the main interest of the current research, and will be discussed later in the findings and discussion chapters. This chapter discusses how mobile devices have developed in the Saudi market and presented and discussed some figures regarding the usage of the top popular social websites that are mostly accessed via mobile devices by Saudi users. Furthermore, it considered the use of this technology in Saudi higher education – in particular, mobile learning's position in KAU as a case study for this research.

This chapter explored, also, the previous studies that have been conducted in m-learning in higher education from around the world, outlining their strengths and weaknesses. In addition, it introduced some technological acceptance theories that have been widely utilised in several contexts, and showed how these theories have been adopted by the current study, as well as constructing the conceptual framework and hypotheses for this study. The next chapter will now outline the methodologies used in this thesis.

Chapter 3 Research Methodology

The previous chapter reviewed existing studies on mobile learning. Using the information gained from this review, I shall now outline the methodology that was adopted for this research, including a description of the research philosophy and design, together with the population, sampling methods, and procedures that were used. The research instrument is presented using the conceptual framework developed in Chapter One.

3.1 Research Design

Epistemology is the foundation of social science research. An epistemological theory is "a theory of knowledge" that explores what and how we can know about the world (Lee, 2012). In addition, it answers the question of 'how' reality can be described, and 'how' knowledge can be generated (Cohen et al., 2011). The methodology is then used to go about acquiring knowledge, with the appropriate method being based on the underlying epistemology – i.e. based on how that reality can be described and knowledge about it generated. The method that will be used in this study should be appropriate to answer research questions, as this is an in-depth study that might require interpretations of participants' perceptions and attitudes.

Positivist and interpretivist philosophies are based on epistemological paradigms, and are considered to be the fundamental methodological styles for social science researchers (Johnson and Onwuegbuzie, 2004). The positivist approach is based on gathering facts through direct observation and experiment (through deductive methods) using quantitative methods and statistical analysis. Because this research focuses on the interpretations of university teachers, however, the interpretivist approach is also used. This involves describing and understanding the experiences of individuals and groups in the social world (induction), and an awareness that knowledge is constructed through experience, thus allowing room for the multiple interpretations that can create a social reality (Cohen et al., 2011). The interpretivist

approach often depends on a qualitative method of data collection. Whereas the positivist is less prone to bias and provides statistical results, the interpretivist accesses the core of the research and provides an opportunity for observations and interpretations (Cohen et al., 2011).

Although different types of epistemological methodology can be used in social research, the present study will use a case study approach. Grounded theory, which was established as a type of epistemological paradigm for producing theories concerning social phenomena, aims to improve higher-level understanding that is "grounded" in (or derived from) a systematic analysis of data (Dick et al., 2009). This study does not use grounded theory, as it is only appropriate for studies that aim to describe a process of social interactions, whilst the present research aims to verify existing theories and to test hypotheses (UTAUT and DIT).

Neither does this study use action research. This type of research focuses on producing benefits to the research's contributors – it is the learning generated from the action–reflection cycle that provides the critical data of action research (Stringer, 2007). Both case studies and action research investigate the research participants in a specific local context (Genat, 2009), but action research includes cycles of action–reflection that produce empirical learning amongst a particular group of contributors – altering both individuals and their cultures (ibid).

Another style of research is the Delphi technique, which is a group facilitation method and an iterative multistage process designed to transform opinion into group consensus (Hasson et al., 2000). However, this thesis aims to provide an understanding of the factors that influence faculty adoption of m-learning, and there is no need to use multistage processes for the data collection process here. Moreover, using m-learning is voluntary, and there is no evidence that current uses of it or intentions to use it in the future require teachers' consensus on mobile implementation. In addition, ethnography needs time to discern both the depth and the complexity of social structures (Jeffrey and Troman, 2004). Although a thick description and rich analysis can be gained from the participants in social settings via this approach, it is also very time-consuming.

3.2 Research Strategy: Case Study

The present study, as has been noted, thus uses a case study as its research methodology. Punch (2005, p. 144) defined the theory behind using case studies as follows: “the basic idea is that one case (or perhaps a small number of cases) will be studied in detail, using whatever methods seem appropriate. A case study is ‘an intensive study of a specific individual or specific context’ (Trochim, 2008, p. 161), and a ‘form of enquiry, an explanation of the unknown’ (Bassey, 2002, p. 108). A case might be a programme, an experience, or an activity (Creswell, 1998), but it should be constrained by time and place (Stake, 1995). Yin (2003) defined a case study as an experimental study that examines a current phenomenon within its actual context, where the boundaries between phenomenon and context are not obvious and various sources of evidence are utilised. However, the current attempt seeks to study faculty perceptions, and is a case study of place rather than an intervention or experiment on mobile learning. This case study aims to gain a comprehensive understanding and a thick description of compound concerns in relation to the adoption of m-learning. The focus of the current case study is on KAU faculty members’ perceptions towards and their adoption of mobile learning. While there may be a variety of specific purposes and research questions, the general objective is to develop as full an understanding of that case as possible. It examines teachers’ acceptance of mobile technology as a learning tool within a university community, and seeks to attain a consensual view about attributes and barriers that might affect their adoption of it.

In this case study, answering ‘how’ or ‘why’ questions regarding the phenomena can provide a deeper understanding of current attitudes and practices in this area through participants’ perspectives. However, it will not be appropriate to generalise these findings because the study is bounded by place (to King Abdulaziz University). Case studies are, by their nature, ‘local’ and ‘immediate’ in ‘character’ and ‘meanings’, which cannot be assumed to be constant across ‘time and space’ (Gall and Borg, 1996, p. 22). In addition, the conclusions from this case study and case studies in general are

difficult to generalise because of the absence of other control factors that cannot be addressed, which might include further, external considerations about faculty members. However, Yin (2003) claimed that some generalisation from case studies is possible, as the results can be generalised to the theory and not to the population.

Another difficulty with case studies is that they often contain a large quantity of information that is hard to summarise. Thus, the narrative interpretation of KAU's faculty members' responses is essential to this examination.

Here, both quantitative and qualitative research designs are used as methods to collect data. King Abdulaziz University (KAU) was chosen as the case study for a number of reasons. Firstly, it is one of the major universities in Saudi Arabia, and the leading Saudi university in using modern technology to enhance students' learning outcomes and teaching performance. Secondly, it is the first university in Saudi Arabia in which teachers use mobile learning systems to deliver digital services (MyKAU) to their students, academic, and administrative staff (KAU, 2010). Finally, being a faculty member of KAU myself provided pragmatic reasons (such as access) to focus on this particular institution. Therefore, this case study uses a triangulation or mixed philosophical approach. A mixed methods approach is selected because "the combination of quantitative and qualitative approaches provides a better understanding of research problems than either approach alone" (Creswell et al., 2007, p.8). The following section explains the research method in detail.

3.3 Research Method

The primary objective of this study is to understand the factors and reasons that influence faculty members' views and interpret these results in the context of the relevant academic literature. My research questions and review of the extant literature enabled me to identify the types of information that needed to be gathered about these views, and thus helped in determining the appropriate methodology. To discover why the faculty accepted or rejected the use of mobile technology and learning in higher education, and whether they would consider using it in their future teaching, I adopt an interpretivist approach with the view that knowledge is socially constructed. Whereas the positivist approach (quantitative) answers "what" questions, the

interpretivist approach (qualitative) answers ‘how’ and ‘why’ questions. In my research, I seek to find answers to all relevant ‘what’, ‘how’, and ‘why’ questions, which is why I adopted a positivist and an interpretivist mixed methods approach (Cohen et al., 2011). The following subheading explains this issue in greater detail.

3.3.1 Mixed methods

According to Leech and Onwuegbuzie (2009), the mixed methods approach “involves collecting, analysing, and interpreting quantitative and qualitative data in a single study or in a series of studies that investigate the same underlying phenomenon”. However, an important clarification needs to be made here. This methodological approach assumes that it is not necessary to choose between quantitative and qualitative approaches, and that the strengths of each approach can be attained without their corresponding weaknesses by adopting a hybrid approach (Leech and Onwuegbuzie, 2009). By using the mixed methods approach, the results obtained via the different research methods can be used to enrich and improve our understanding of the issues under study and to promote new ideas about them in order to attain answers to questions that are problematic using a single method (Cohen et al., 2011, p.25). With mixed methods research, the researcher benefits from the generalisations produced by quantitative research, and the depth of detailed understanding that is offered by qualitative research (Leech and Onwuegbuzie, 2009).

Furthermore, mixed methods provide the chance for triangulation and the different methods used are potentially complementary. According to Cohen et al. (2011), reliability can be provided through a convergence of findings acquired through different methods (the quantitative and qualitative). Complementarity is achieved by clarifying the results obtained with one method through applying the other (Cohen et al., 2011, p.25). In my study, for example, I use a sequential QUAN → QUAL design, as the qualitative part supports the design and interpretation of the data obtained from the quantitative part. Figure 3.1 illustrates the research methodology, which starts with the design, collection, and analysis of quantitative data, and is followed by the design of the qualitative instruments based on the results of the quantitative data analysis. The

collection and analysis of the qualitative data then follows. Owing to the importance of the two approaches, equal priority is given to both phases, and data is integrated during interpretation, which also enables proposed hypotheses to be developed to improve the qualitative instrument used for data collection in the next part of the research. Using the quantitative results, it is possible to prepare and develop the qualitative part of the research to reach a deeper understanding of the core issues and expand the research further. My primary focus is to explain quantitative results by exploring certain results in more detail (for example, using interviews to better understand the results of the quantitative phase).

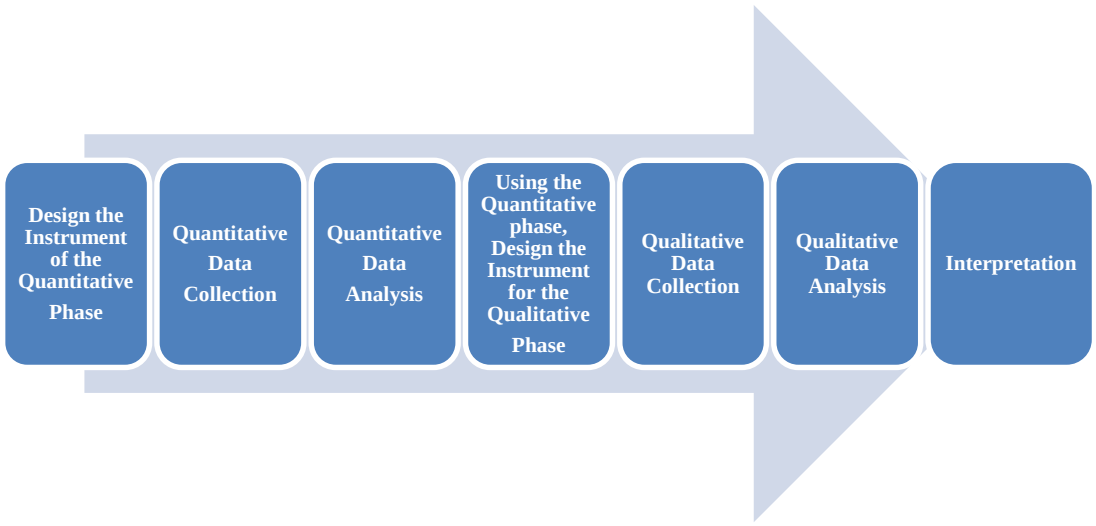

Figure 3.1: Research methodology (Sequential Explanatory Strategy)

Criticisms of qualitative research suggest that it involves personal impressions and is thus influenced by researcher bias, so there is no guarantee that a different researcher would come to the same conclusions, and also that it lacks generalisability (Denzin, 2012). However, qualitative methods tend to produce a large amount of detailed information about a small number of settings (ibid). On the other hand, some of the disadvantages of the qualitative approach could be addressed by integrating a quantitative approach with it. There are several benefits of using quantitative research, including that it enables the testing and validating of theories and hypotheses and the generalisation of research results, provides quick methods to obtain data, is less time consuming than qualitative research, and produces independent data (Johnson and

Onwuegbuzie, 2004). However, the quantitative approach by itself cannot provide in-depth information about the reasons why the relevant factors impact on faculty members' adoption or rejection of using m-learning. Hence, using the mixed methods approach offers a way to increase the strengths of the positivist and interpretivist methods and to reduce their weaknesses.

The strengths of the mixed methods approach are that the data is relatively straightforward due to the stages being clear and distinct, and the data is easier to describe than that produced through concurrent strategies (Cohen et al., 2011, p.26). However, one weakness of this approach is that it is time-consuming, as both phases are given equal consideration and priority, as well as being conducted in sequence. Donaldson's (2011) research also uses a sequential explanatory strategy with both a quantitative component (using data collected from a survey) and a qualitative component (deriving qualitative data from interviews of students within the same population) in his examination of students' behavioural intentions to adopt m-learning. Although implementing and describing the data is not difficult, this strategy requires a significant amount of time to complete the two phases of data collection (the survey and the focus group in his study). Although focus groups are used to collect in-depth data, interviews have the same power to supplement the results of the survey tool in my study.

In addition to the research importance discussed in the first chapter, it is also important to detect whether the mixed methods approach is the best paradigm for collecting research data as many of the studies of user adoption of technology have relied on survey data collection (El-Gayar and Moran, 2006; MacCallum and Jeffrey, 2013; Nassuora, 2012; Thomas et al., 2013; Venkatesh et al., 2003), thus restricting more investigation of the reasons behind users' decisions to adopt the technology. In addition to this, as there are few studies focused on utilising mixed methods in technological acceptance research – in particular, in mobile learning contexts – this thesis provides an important attempt to verify the use of this method in social sciences research, which could add significant findings to the research and help future researchers in this regard. Thus, the present study will add new evidence in educational research concerning the strengths and weaknesses of the mixed methods approach.

3.3.2 Online Mixed Methods

It is clear that ICT can be used to exploit online environments effectively in mixed methods research (Johnson and Onwuegbuzie, 2004). For example, with online questionnaires, focus groups and interviews, the researcher can spend a large amount of time focusing on the quality of the data, and most web survey modes are less expensive than comparable telephone or mail surveys (Vehovar et al., 2001). In addition, as the social norms of Saudi society involve a large degree of separation between males and females, an online mixed-methods approach can help to maintain and respect such norms and privacy. It also provides a flexible environment for both myself, as a female researcher, and the male and female participants of the study, with no spatial or temporal constraints for interviews, and the opportunity to accommodate a large number of participants via online survey and interviews. Further explanations of how the online aspects of the research were conducted are illustrated in the following section.

3.4 The Population

The target population is defined as "the population about which the researcher would ideally like to generalize the results" (Akour, 2009). The accessible population for the intended research are the 7,889 faculty members including all King Abdulaziz University branches and campuses in KSA, which has a campus population of 82.152 students (MOE, 2015). However, this research focuses mainly in Al-Sulaymaniyah campus in Jeddah which has 3,224 faculty members. The survey population frame is made up of both male and female university teachers. There is not a perfect sample number for most pieces of research, with the number of participants depending on the nature of the research (Cohen, et al, 2011).

With regards to determining the sample size of the research, the data collected from the survey samples helped to facilitate the collection of data at the interview stage (Teddlie and Tashakkori, 2009), and both methods work complementary with each other in ensuring that a sufficient sample size was produced for each stage. The procedure used for determining the sample size at the survey phase was drawn from Kotrlik and Higgins' (2001, p.48) table, which includes information on sufficient

sample sizes for quantitative research based on data type and the alpha level (p=.05). In this thesis, the sample size needed to be appropriate for a data set using the five-point Likert scale. Hence, the required sample of the research population from faculty members in KAU (N= 3,224) would comprise 114 completed questionnaires. However, the higher the sample size, the better, mainly to ensure that the sample is representative of the population, as well as to enable the study results to be related back to the population and for the results to be generalised.

As stated earlier, the Saudi culture is strongly influenced by religion, with the segregation of genders in Saudi society being present at university-level education (Alebaikan, 2010). Although both genders can study at the same universities, males and females are separated into different campuses, and this presents a number of difficulties for the data collection phase. For example, conducting personal interviews with male faculty members raises difficulties for a female researcher as she must be accompanied by a "Mahrram" – an immediate family member – for the duration of the interview, which is one of the reasons that online surveys and interviews were used, as already noted.

3.5 The Data Collection Procedure

This section explains both the quantitative and qualitative data collection techniques that were used in this research. It starts by providing details on the questionnaire part of the study by explaining the design of the survey and the results of the pilot study. It finishes by providing brief descriptions about how the analysis of the survey data was approached. The next subsection then provides details about the qualitative phase, outlining the interview technique and how the resulting data was to be analysed.

3.5.1 The Quantitative Phase

Internet questionnaires were utilised in my study, and these have numerous benefits over traditional mail surveys, such as lower costs, being lower non-response items, having faster return rates, and producing a higher percentage of completed answers (Lobe and Vehovar, 2009). They also have limitations, including the negative attitudes that exist to email surveys and mass mailings, and the fact that depersonalised emails

are more likely to be ignored by possible respondents (ibid). Sending personalised emails from a person in authority known to the participants and sending follow-up letters after the initial mailing are suggested ways for addressing these limitations (Lobe and Vehovar, 2009). Therefore, the survey was sent via the University's email to all university faculties instead of to potential respondents' personal emails, both to respect their privacy and raise the survey's perceived credibility.

After gaining consent to conduct my research at King Abdulaziz University (KAU) in Saudi Arabia (SA), faculty were invited to participate in an online survey for the quantitative part of this research. All university faculty were notified about the existence of the survey via a Webmaster email from the university administration. The email included a Research Information Sheet as an attached file, and was provided at the front of the survey webpage, which briefly explained the goals of the research, gave information regarding mobile learning and its definition, the importance of participation in the survey, and an outline of the survey's subject matter (see Appendix 1). Faculty members were encouraged to participate in the survey by sending emails to each head of department in the university that asked them to distribute and encourage their colleagues from the male and female sections to participate in this survey that is looking to explore their views and concerns. The email also included two links to the webpage for the survey, and was written in both Arabic and English so that non-Arabic and non-English speakers had an equal chance to present their views. The Smart Survey On-line Survey tool was utilised, and the participants were informed about the research information and the length of the questionnaire (which might take from 15 to 20 minutes) on the survey page. In addition, they were informed that they would be providing their consent to participate in the quantitative part of the research if they pressed the "participate" button (see the survey in Appendix 1).

The survey link was emailed to all teachers at the university, and the responses were monitored to ensure that surveys were being completed by teachers working in different colleges, of different ages and genders, with varying experiences and interests. The online study may be unavoidably biased towards participants who are enthusiastic about (or at least comfortable in using) technology, whilst others who are less enthusiastic or comfortable with its use in general may not have been as keen to

fill in an online questionnaire to participate in the research, and may thus have ignored the email. Thus, a back-up plan was developed to ensure that the sample contained a wide representation of the population and to avoid biases. This would involve distributing printed copies of the survey to departments with low response rates, encouraging teachers that are not enthusiastic about technology to fill these in and participate in the personal interviews so that an accurate representation of attitudes in this area can be realised. In addition, the fall back plan would also be utilised in the scenario that insufficient participants were recruited. Under this scenario, printed copies of the survey would be sent to all the teachers in different departments, and they would be encouraged and advised to participate in this survey by being informed that their opinions and attitudes are important to the study.

3.5.1.1 The survey instrument

As the problem statement in Chapter One outlined, it is important to examine what factors determine faculty members' (lack of) acceptance of mobile learning and the reasons for this. The factors that are tested will not all influence the acceptance of mobile learning to the same degree, but the findings from the research questions will help to determine where university teachers could focus in order to improve their attitudes towards its use, and can thus aid in the successful implementation of mobile learning. Discovering faculty members' attitudes toward mobile technologies and mobile learning (m-learning) can help in developing a richer understanding of the barriers and attributes associated with the use of mobile devices in the higher education setting. Hence, the research methods and instruments must be carefully designed and used in order to produce a sufficient level of understanding about these phenomena.

Surveys were used to investigate the attitudes, perceptions and beliefs of teachers regarding their current and future use of mobile devices for learning. The survey tools were designed to be as short as possible (Oppenheim, 2000) in order to maximise the response rate from teachers. All the questions in the questionnaire were designed in relation to the research hypothesis, and the questionnaire was divided into several sets, each consisting of a block of questions for investigating a particular factor. UTAUT, DIT and the extended factors were used to examine and analyse the collected data

from the questionnaires, and the results were used to answer the research questions and to verify the truth of the research hypotheses.

This section explains the design process of the quantitative tool for examining the research questions and hypotheses. First of all, it is important to show and explain the initial survey instrument before conducting the pilot study in order to understand the modification process that the survey passes through in the development of an effective questionnaire to confirm its validity and quality. The questionnaire was initially divided into three themes, with the first two themes using multiple choice questions and the last theme having open-ended questions. The first theme monitored the demographic information of the participants in terms of age, gender, educational qualifications, academic positions, faculty worked in, years of teaching experience, and information on the type, features, and usage skills of the mobile devices that they used. The second theme explored participants' opinions on attributes and obstacles that promote or impede their acceptance of mobile learning in their professional practices. These attributes and obstacles included the seven proposed constructs all together in one section. This theme also recorded faculty members' opinions about their current and future use and intentions to use mobile devices in their professional practices. The third theme used two open-ended questions to provide faculty with a free space to present their opinions about factors that encouraged and discouraged their use of m-learning currently and in the future, regardless of the factors suggested in the research (see Appendix 1 for the survey statements before the pilot study).

Some of the items used in Venkatesh et al.'s (2003) survey were modified and used to fit the context of the current study. In particular, those factors relating to performance expectancy (PE), effort expectancy (EE), social influence (SL), and facilitating conditions (FC). Although the factors of perceived trialability (PT) and resistance to change (RC) factors were used in previous research, the way they were utilised in this research was not suited to the current study context. In addition, the social norms (SN) factor was 'a new' construct that had not been studied before. Hence, survey statements were invented to explore these factors. The structure of the survey consisted of a mixture of multiple-choice, Likert, and open-ended questions, the latter aiming to provide more in-depth data on the perceptions and attitudes of teachers. The majority

of the questions in the survey were Likert-scale ones, and were designed to be analysed quantitatively, while the open-ended responses were analysed qualitatively and also designed to allow participants to express their attitudes towards and their perceptions of m-learning. Survey questions were created in relation to the research context. However, the survey needed to be tested before it was conducted with the actual target sample.

Some of the information that needed to be gathered to properly address the research questions pertained to the perceptions of teachers towards using mobile technology both now and in the future. This enabled the potential influences on their use of mobile devices as learning tools in the traditional classroom to be determined. It was hypothesised that performance expectancy (PE), effort expectancy (EE), social influence (SL), facilitating conditions (FC), perceived trialability (PT), resistance to change (RC), and social norms (SN) would all have significant roles as determinants of teacher-acceptance and use of m-learning in their current and future practice, with social norms and gender differences being expected to be the greatest predictors of faculty members' initial adoption of m-learning. In addition, it was suggested that faculty demographics would have a significant influence on their use of m-learning. The next paragraphs provide an outline of the methods that will be used to answer the research questions.

3.5.1.1.1 Restatement of the Research Questions

Main research question: *How does Saudi culture influence faculty members' adoption of mobile learning in Saudi higher education, and is gender an important factor for its uptake within this constituency?*

The main research question hypothesises that social norms will be more significant than other factors in terms of having a negative impact on the faculty adoption of m-learning in their current and future teaching practice. This factor helped in understanding the ratio of affects that social norms had on faculty perceptions about using m-learning in their current and future practice. The social norms construct was triangulated with the gender variable to examine the combined affect that both had on faculty intentions to adopt m-learning. As no earlier studies examined the impact of

social norms – in particular in the Saudi context – new survey items were created to explore this factor. These items are presented in Appendix 1 (the survey instrument before editing).

Question 1: **In what ways are teachers currently using mobile devices with their students inside and outside the classroom? How do teachers perceive the future of mobile devices as tools for learning?**

This question investigates the current and future use of m-learning by teachers in an academic setting, and is useful for monitoring the perceptions and attitudes of teachers towards using mobile devices for enhancing learning in the classroom, as well as for creating opportunities to expand learning beyond the classroom. It was hypothesised that collecting data in relation to this question would help to develop an understanding of the ways in which m-learning is currently utilised, which can then be used to evaluate its success, its shortcomings and how to improve its implementation. Looking at the possible future uses of mobile technologies in the learning environment may help teachers to better understand the usefulness of these devices, which may in turn facilitate future pedagogical developments. Although the survey provides frequencies and percentages of the number of faculty that are (or are not) using m-learning, its actual use and how it could be used in the future will be obtained through the qualitative data collection process.

In addition, teachers' negative attitudes and perceptions toward using mobile devices as learning tools (now or in the future) will help in developing a deeper understanding of whether the teachers themselves are a major obstacle for the deployment of m-learning in Saudi higher education. Three multiple-choice options were designed to help build a better understanding of the current provision, use and attitudes towards mobile learning and mobile devices, as well as the mobile learning applications that may see an uptake in the future. The participants were asked to choose the best statement that represented their current and future opinion of using mobile learning. Only one statement about this could be chosen (see Appendix 1). However, the survey results aim to provide numeric data showing how many participants are using m-learning. Thus, further in-depth data from the open-ended questions in the survey and

the interviews will help in developing a greater understanding about faculty use of m-learning – how it is currently used, and how the faculty could be encouraged to (continue to) use it in the future.

Question 2: **Which of the following independent variables (if any) are significant predictors of the behavioural intention to use mobile learning: performance expectancy, effort expectancy, social influence, facilitating conditions, perceived trialability, resistance to change, or social norms?**

As was explained in the process of outlining the research problem, it is necessary to understand the factors that relate to the use of mobile devices in supporting learning. The researcher suggests that some factors that could affect teachers' acceptance and use of m-learning are: performance expectancy, effort expectancy, social influence, facilitating conditions, perceived trialability, resistance to change, and social norms. This research question aimed to explore the proposed m-learning acceptance model (see Figure 1.1). It illustrates the relationships between the constructs and the current and future use of m-learning, and highlights the factors that have had the greatest impact on the faculties' adoption of m-learning. In addition, in contrast to previous studies, this study also aimed to explore the relationships between the factors, as prior research focused merely on the relationship between performance expectancy and effort expectancy. Thus, the collected data was expected to aid in designing suitable questions for the interviews. The majority of statements are Likert-scaled from (1) strongly disagree to (5) strongly agree, and were designed to be analysed quantitatively. In addition, the majority of the survey items were modified based on Venkatesh et al.'s (2003) survey, and re-worded to suit the research's context and aims.

Question 3: **Is there a statistically significant relationship between faculty members' personal characteristics (including gender, age, years of teaching experience, academic rank, mobile device and internet usage) and their perceptions towards using mobile learning?**

Question three aims to explore the demographic data about the participants and how this relates to their acceptance of m-learning – in particular, the differences between

male and female teachers' use of mobile devices for learning, and what factors they perceived to encourage them to use m-learning. Thus, the survey contained additional questions pertaining to gender and other demographic variables that needed to be considered to ensure the validity of the research hypothesis. The participants were asked about their genders, ages, academic degrees, positions and titles, what faculties they worked in, their years of teaching experience at university level, and certain information related to their mobile devices.

Finally, the two open-ended requests for information were added to record further opinions and experiences that teachers wished to contribute in relation to their use of m-learning, which were used to support the answers to the research questions and to provide insights for the design process for the interview phase.

The questions in the questionnaires were designed to maximise the reliability and validity of the collected data by taking care of the wording of questions, avoid leading or ambiguous questions, and ensuring the confidentiality and anonymity of the faculty members' identities. To clarify and confirm the teachers' understanding of the concept of mobile learning, the research scenario (presented in Appendix 2) was provided in the questionnaire through a link to a weblog that explained the purpose of the research and gave a sample scenario of how m-learning could be used in the Saudi higher education context. To ensure its validity, the survey was piloted and presented to a panel of experts and reviewers in the field of educational technology. Further information about this is now provided in the discussion of the pilot survey study.

3.5.1.2 The Survey Development and the Pilot Test

This section discusses the development of the research survey for collecting data on faculty members' perceptions on mobile learning in higher education. According to Gay et al. (2006), content validity is the degree to which a test measures a proposed content part. Content validity, which is identified by expert judgment, should involve item validity. Item validity is inventive, considering whether the test items are relevant to assessing the proposed content part. Content validity was tested during the pilot test, with experts in the area of questionnaire development, educational research and

methodology being consulted to review the instrument for the quality, clarity, comfort level, and appropriateness of the survey questions in relation to the research. Comments were prompted in order to increase the quality of the survey. The instrument was modified according to recommendations.

It was an important to solicit the professional panel's opinions regarding the survey questions in order to prevent avoidable problems appearing during the research process, and it was also important that this professional panel shared the same culture of the research community so that they could identify which questions were suitable for the participants and how the survey could be improved. Thus, ten panel members were invited from the Information Technology (IT) department at King Saud University in order to save the population of the research sample, taking into account the similarities of the social culture and the levels of expertise between the members of the two organisations. The initial version of the survey was sent to these panel members, and they were asked to provide feedback on the survey questions and suggest any modifications that they thought necessary. Seven responses were received and analysed.

3.5.1.2.1 Internal Consistency Reliability

Cronbach's alphas were used to calculate and assess the level of the internal consistency reliability of the seven constructs. This is one of the most common approaches for assessing reliability, and is based upon the average correlation among the items in a scale (Brown, 2002). Normally, subscales in the questionnaire are expected to have higher than 0.70 Cronbach's alpha, which is considered adequate (ibid). The reliability coefficients of each of the constructs are presented in Table 3.1. It reveals that the following constructs demonstrate sufficient levels (alpha .70 or greater) of internal consistency reliability: performance expectancy, effort expectancy, social influence, Facilitating condition, trialability, perceived social norms, and resistance to change.

Subscale	No. of items	Cronbach's Alpha
Performance Expectancy	4	0.937
Effort Expectancy	3	0.884
Social Influence	4	0.757
Facilitating Conditions	5	0.884
Trialability	2	0.727
Resistance to Change	4	0.859
Perceived Social Norms	3	0.725

Table 3.1: Internal Consistency Reliability for Mobile Learning Subscales

According to Gay et al. (2006), the questionnaire should be eye-catching and short; enclose elements that relate to the research's purposes; gather demographic data only if necessary; define and explain ambiguous terms; word the questions clearly; organise elements from general to specific; and leave sufficient space for responding to open-ended items. Hence, thoughtful consideration needs to be given to the length, element order, and type of each question in the questionnaire. A developed survey tool was advanced for this study, based on Gay et al.'s (2006) guidelines for constructing the questionnaire and the judgment panel.

3.5.1.2.2 The Survey-Modification Process

This was an important process, which included modifications to the language, structure, amount, order, and appearance of the instrument items. Anonymity and confidentiality of information were confirmed and modified. The panel welcomed and commended the presence of cover page in the survey which included important information about the aims of the survey, the time needed for completing it, and the researcher's contact email in case any further assistance was needed or a copy of final

data was desired. However, the arbitrators commented that the survey was too long and need to be reduced. Hence, the initial survey – which consisted of thirty eight statements to record the faculty perceptions regarding the attributes and obstacles of adopting m-learning – was reduced to twenty-four statements (see Appendix 1: the survey instrument before editing). Overall, the panel members said that it also had to be split into sections so that the aim of each element in the survey would be clear and understandable to all the participants. For example, they said that the attributes items should be put under the specific section of 'attributes' and similarly, that the obstacles items should be placed in the 'challenges' section following the attributes section (i.e. 17 attributes statements and 7 obstacles statements). In addition, they observed that statements about current and future intentions to use m-learning statement should be separated in another section and ordered after the demographic data.

For the demographic information section, a comment was made about the ranges used for the age groups, as the system of Saudi studies commonly uses the following type of range scales – 30 and less than 40, 40 and less than 50, and so on. Similarly, regarding number of years of teaching experience, it was suggested that the following ranges be used: 10 and less than 15, 15 and less than 20, and so on. The second section of the questionnaire included many statements to identify the perceptions of the respondents toward the use of mobile learning. A number of panel members noted that there were some repeated statements which had the same meaning, and that some phrases needed to be reworded because their meanings were unclear. Therefore, some statements needed either to be deleted or reworded, and the relevant actions was taken based on their suggestions by reducing the number of questions, deleting duplicated statements, and rewording the ambiguous questions.

As stated earlier, the survey questions used a Likert scale format for measuring the attributes and obstacles that used a five-point scale, ranging from strongly disagree (1) to strongly agree (5). All of the judgment panel members agreed to this scale and commented that this is the scale used most frequently in their surveys. On the last section – comprising the two open-ended questions – one judgment panel member commented that those questions would not be analysed much, but the rest agreed that it was an acceptable practice when designing questionnaires, as the open-ended

questions would add in-depth information that could help in understanding the participants' perceptions. Finally, a space was provided for the faculty members to provide an email address if they wished to participate in the semi-structured interviews. Table 3.2 presents the sections and construct items developed in response to the pilot test.

The cover page
More information added, including the research title and a web page for more information about the research.
Section one contained eight items of demographic information.
Sample demographic data comprised gender, age, years of teaching experience, academic rank, college or department, mobile device and internet usage.
Section two contained three items on the construct Current Use (CU) and Future Use (FU) (choose one from these statements)
I have not used mobile learning before and I will not use it in the future. I have not used mobile learning before and I will use it in the future. I use mobile learning and I will continue using mobile learning with my students in the future.
Section three contained nineteen items on the attributes impacting on the acceptance of mobile learning.
Four items on the construct performance expectancy (PE)
PE1: It is useful using mobile learning technology in my teaching. PE2: Integrating mobile learning in my class improves students' learning and engagement.

PE3: Students in my classes engage in planned activities that involve the use of mobile devices. PE4: Mobile learning provides opportunities for improving my learning and teaching practices.
Three items on the construct effort expectancy (EE)
EE1: Dealing with mobile learning is clear and understandable. EE2: It would be easy for me to become skilful at using mobile learning. EE3: Learning to operate mobile learning is easy for me.
Two items on the construct social influence (SI)
SI1: My colleagues who use mobile learning influenced me to use mobile learning too. SI2: My students are willing to integrate mobile learning in class.
Six items on the construct facilitating conditions (FC)
FC1: I have the resources necessary to use mobile learning. FC2: I have the knowledge necessary to use mobile learning. FC3: If I have problems and/or difficulties with using mobile learning in my teaching, there is a dedicated team at the university to help. FC4: My university administration has encouraged the use of mobile learning. FC5: The lack of ICT infrastructure in Saudi's universities limits the integration of new technology into my teaching (note that ICT refers to the computer and the internet). FC6: The existence of some features in mobile devices (e.g. the Internet, WiFi, Apps, …etc) makes their integration into teaching and learning a suitable alternative to solve the problem of the lack of ICT infrastructure.

Two items on the construct Trialability (T)
PT1: I am currently able to use mobile devices in teaching and learning (e.g. uploading lectures, downloading and or uploading assignments, quizzes, communication with students, sending feedback). PT2: My students are able to use mobile devices' tools (e.g., listening to the lectures, downloading and uploading materials, chat online, etc.).
Section four contained six items of challenges impacting on acceptance of mobile learning.
Four items on the construct Resistance to Change
RC1: The blending of traditional teaching methods (teacher-centred learning) and the use of mobile technology in educational environments is urgently needed to improve the quality of my teaching performance. RC2: The blending of traditional teaching methods (teacher-centred learning) and the use of mobile technology in educational environments is urgently needed to improve my students' learning. RC3: The traditional teaching methods (teacher-centred learning) are not fit for the requirements of the digital age. RC4: Faculty members clinging to traditional ways of teaching (teacher-centred learning) is one of the obstacles to the integration of mobile learning.
Three items on the construct Saudi Norms (SN)
SN1: The conservativeness of some Saudi universities (e.g. staff, students) in refusing to use mobile devices equipped with a camera negatively affects the use of mobile learning in my class. SN2: The misuse of mobile devices by my students prevents me from using mobile learning in my class.

SN3: The privacy of women in Saudi society limits their use of mobile learning technology inside the campus.
Section five contained two open-ended questions and a text-box for respondents to provide their emails if wanted to participate in the interview phase.
1. Please give two primary reasons why you would use (or not use) mobile learning in your teaching? 2. Please specify, in your perception, how you could be encouraged to implement mobile learning in your practice in the future? 3. If you want to participate in an interview, please provide us with your email.

Table 3.2: The sections and construct items developed after the pilot test

According to Gay et al. (2006), factors that can decrease the validity of survey instruments include unclear test directions, ambiguous questions, vocabulary that is too difficult for participants, complex statements, and inconsistent and subjective scoring methods. The design of the survey instruments and the pilot test addressed these problems, and accordingly increased the validity of the instrument. After this, a final instrument was developed for administration to the survey population (see Appendix 1). The next paragraph now explains how the survey was analysed.

3.5.1.3 The Quantitative Data Analysis

The quantitative data produced by this research was analysed using the Statistical Package for Social Science (SPSS). The demographic information, faculty members' capabilities with mobile devices, current and future uses of mobile learning, and the factors of interest in the research will be presented in graphical ways for analysis – for instance, in pie charts, histograms, and frequency tables. In regard to the survey's questions connected with constructs in the UTAUT, the DIT and the suggested constructs, the obtained data will be analysed via a descriptive data analysis, a Chi-

square test, an independent t-test, Pearson correlation tests, and binary logistic regression in order to test the hypotheses and develop an understanding of teachers' perceptions and attitudes. Table 3.3 illustrates how the research questions will be answered and analysed by presenting the potential variables, the aims of the statistical techniques used, and the reasons for their use in relation to each research question.

Research questions	**Variables**	**Measurement approaches**	**Data analysis**
Main Research Question	Current and Future use of m-learning; Independent variables (Social Norms); Dependent variables (gender).	To investigate the impact of the social norms on faculty's current and future use of m-learning, and to explore whether gender is a significant moderator of this impact.	- Descriptive frequencies and percentages procedure. - Independent T-Test - Chi-square test.
Question 1	Current and Future use of m-learning.	- To find the nature of the data, mean, percentage and standard deviation. - To find the number of faculty that are (or not) currently using m-learning, and to measure and predict their willingness to use or continue using it in the future.	Descriptive frequencies and percentages procedure.
Question 2	- Independent variables (Performance	- To explore the significant factors that affect teacher adoption of m-learning.	- Descriptive frequencies and

	Expectancy (PE), Effort Expectancy (EE), Social Influence (SL), Facilitating Conditions (FC), Perceived Trialability (PT), Resistance to Change (RC), and Social Norms (SN)). - Current and Future use of m-learning.	- To find the combined affect and the most significant predictors of current adoption of m-learning, and the encouragement and discouragement variables in predicting future intentions to use it. - To find the relationships between all factors.	percentages procedure - An independent T-Test - Pearson correlation statistics -A binary logistic regression
Question 3	- Dependent variables (gender, age, years of teaching experience, academic rank, mobile device usage). - Current and Future use of m-learning.	- To find relationships between faculties, different personal characteristics, and faculty perceptions towards the use of mobile learning.	-Descriptive frequencies and percentages procedure - An independent T-Test -Pearson correlation statistics -A binary logistic regression

Table 3.3: Quantitative analysis for research questions and hypotheses

The quantitative data analysis used in this thesis aims to calculate mean and standard deviations for each question through descriptive data analysis. Standard deviation characterises the differences in responses in relation to the mean, with a low standard deviation suggesting that the data might be very close to the average. A Chi-square test is used for exploring the relationship between two categorical variables, and an

independent t-test is used for exploring the relationship between one categorical variable and continuous variables. As relations between constructs should be tested in order to inspect the suggested m-learning acceptance model, a correlation analysis will be calculated based on each of the constructs in the proposed model. The Pearson correlation coefficients are used to measure the strength of the relationship between two variables, and also for exploring the strong points in the relationships between continuous variables (McLellan, 2009).

Binary logistic regression is utilised to assess the combined effect of all predictors among the groups for current and future use of m-learning, and to estimate the unique independent effect of each potential outcome predictor (PE, EE, SI, FC, T, RC, and SN). An important feature of the binary logistic model is that it estimates a whole indication of how well the model fits with the data (Pallant, 2013), which also is an interest of the research, and will be included in the data analysis process.

3.5.2 The Qualitative Phase

After conducting and analysing the survey and the data collected during the quantitative phase, synchronous online semi-structured interviews were then conducted via video conferencing application (for example, Adobe Connect). In the recruitment process for the qualitative phase, a general invitation notice was formulated and delivered within the online survey. As previously noted, both female and male faculty members were interviewed online to respect the Saudi social norms of gender segregation. Participants' consent will be explicitly requested for the online interviews in order to get their approval to use the data that will be provided, and to assure participants that their data will be kept confidential and anonymised.

The interviews will follow the survey phase. This qualitative method is a key tool for data-gathering in the social sciences (Miles and Huberman, 1994), and is used in this research to gain a clear picture of the foundations – together with rich descriptions and explanations – of teachers' behaviours surrounding and attitudes towards the subject of the research.

In qualitative research, there no particular method for determining the perfect sample size, but 'fitness for purpose' might help in informing the interview sample (Cohen et al., 2011). The data collected from interview phase was used in an attempt to generate a deeper understanding of the phenomenon under study rather than to generalise results, as generalising results could be better achieved through the quantitative phase. In addition, the interview sample should take into account the representative features of the population, which means that the sample should contain approximately equal number of male and female participants from different age groups, who work in different faculties, have different teaching experiences, and different academic degrees. Furthermore, the sample should not be too large as this may lead to a data overload – i.e. too much data to listen to, transcribe, translate from Arabic to English Language, and then interpret and analyse, given the time constraints. Also, the sample should not be too small, because too little information could not explain the research phenomenon. Thus, a sample consisting of between twenty to thirty interviewees was determined to be sufficient to collect the interview data, taking into account the criteria presented earlier in this paragraph (i.e. gender, age, teaching experience, academic degree).

The content of the interviews questions will be derived from the analysis of the findings of the survey phase (this will be explained further in Chapter Five). In addition, the interviews will comprise a mixture of conversation and questions. The interview questions will ask why and how the survey generated its results, and test the hypothesis of the research. The faculty members who agree to be interviewed will be invited to participate in an online interview at a time of their choosing, and will be given the option to reserve rooms with computers and the internet within the university for the interview. Each participant will take part in one online interview, which will take between 45 and 60 minutes. In addition, information about the research and its aims will be written on the white board space in the Adobe Connect software, as specified earlier. The participants will then be asked for their consent, which can be provided by signing the consent forms, or in writing on the chat bar, or verbally by voice-recording.

Thus, the survey participants partially construct the interview sample. Interviews are useful for identifying problems and difficulties faced by teachers using mobile learning, whilst also encouraging interviewees to find appropriate solutions that will be useful in addressing the research problems. Interviews rely on qualitative data collection, and the process of collecting data from interviews is based on the preliminary results from the survey.

The interview questions will aim to uncover teachers' opinions about the uses of m-learning. For example, it may be that some teachers will criticise the use of mobile technologies in the classroom, and perceive m-learning to be unsuitable for managing the technological learning environment efficiently. If this is the case, then the reasons for these negative perceptions will be explored. Moreover, it might reasonably be expected that other teachers will understand the importance of utilising m-learning. If this is the case, then the research will aim to discover the types of mobile technologies that teachers can use with students in the classroom to determine what m-learning could offer and to discover what obstacles exist here. Examples of m-learning uses inside and outside the traditional classroom will be provided to participants, along with information on successful trials that have been conducted in high-ranking research universities using innovative teaching and learning philosophies and practices. These will be used to examine their attitudes about the potential for applying such approaches and practices within the Saudi educational context.

In addition, the qualitative phase aims to provide possible solutions to the obstacles that hinder a pedagogical shift to using m-learning. Collecting data from this question (or set of questions) will aid in understanding the perceptions and attitudes of teachers, and in clarifying any misconceptions among teachers about the potential for mobile technologies in higher education. To ensure the research's validity, the interview data will be triangulated with the quantitative data to build rigorous justifications for emergent themes, which will be organised into predicted categories, consisting of faculty perceptions about m-learning use, influencing factors, and other barriers. The following paragraph describes the pilot process for the interviews and how the data obtained in the interview phase will be analysed. In addition to discussing the pilot

study of the semi-structured e-interview, this section also further explains the reasons for using e-methodology and the design of the online interview.

3.5.2.1 Pilot study of the interview phase

In social science research, the term 'pilot study' or 'feasibility study' is a mini version of a full-scale study" (Van Teijlingen and Hundley, 2002, p.33). Baker (1994) noted that "a pilot study can also be the pre-testing or trying out of a particular research instrument" (p.182–183). In this study, the interview questions were piloted in an attempt to address any issues that could be resolved prior to embarking on the main study. Thus, the interview pilot study was conducted with the objectives of testing the wording of the interview questions, determining if the research instruments would elicit the needed data, checking the investigator's skills in doing e-interviews, testing the reliability and validity of the results and, most importantly, checking the efficiency of the software used in collecting the interview data (i.e. Adobe Connect). Although a pilot study does not guarantee success in the main study, it greatly increases the likelihood of this (ibid).

3.5.2.2 Purpose of E-Interview Research

Online interviews are ones conducted with the use of ICT to collect data (Salmons, 2014). In this research, the e-interview was conducted synchronously using web conferencing meeting spaces through Adobe Connect, which allows for text, audio and video conferencing, and more. It is essential to align the purpose of choosing e-interviews with the design the research methodology. The e-interview was chosen in the first place because it provides a convenient way to engage with the research sample given the geographical distance between the researcher and the participants, with the study being based at University of Leeds in the UK, and the research population being faculty members within a single Saudi university. Thus, using such technology to carry out this research facilitated the effective use of time and financial resources in its data collection phase (Opdenakker, 2006).

Moreover, the choice of e-interview also had a cultural dimension. The use of ICTs as a medium for interviews enabled the elimination of constraints that would have made in-person interviews practically challenging in this research (Salmons, 2014). In

accordance with Saudi culture, the presence of a Mahram is required for a female researcher to interview a male participant, or vice versa. Al-Ghadyan (2004) overcame the difficulty of accessing female interviewees for educational research by using telephone interviews, which was the best instrument available at the time of this research, and the present research similarly chooses the best practical means of interview currently available. In addition, e-interviews can help to avoid prejudice and any difficulties that might arise in the relationship between men and women. In addition, I was motivated to use this form of interview by the gap in the Arab literature, where no studies have thus far been conducted using e-interviews to examine the views of male and female Saudi faculty members. As a result, the use of this method may encourage future research to adopt this approach as well.

Hinchcliffe and Gavin (2009) stated that online connections can be made with a broad range of people otherwise difficult to access because of geographical boundaries, and can reduce social isolation and engender connectedness with society. In contrast, conventional face-to-face and telephone interviews can be argued to reduce opportunities for access to broader samples and compromise data accuracy. Respondents in virtual spaces can:

> *…escape their own embodied identities and accordingly escape any social inequalities and attitudes relating to various forms of embodiment. Race, gender and physical disability is indiscernible over the Internet. Any basis for enacting embodiment discrimination is removed; freeing access to participation and granting each participant equal status (Wilson, 1997, p.149).*

Although the participants are known from their questionnaire records, their personal information (e.g. age, gender, academic position, and email addresses) were used merely to categorise them in the data analysis phase.

Technological choices are interrelated with issues involving the data type, its method of collection, and ethical considerations (Salmons, 2014). As this phase of the research collected qualitative data, seeking in-depth and detailed information to answer ‘why’ and ‘how’ questions, the decision to choose Adobe Connect was an obvious one

because of the free licence that has been obtained by the University of Leeds to use it and the good quality text and audio features it has for interacting with others. Although Adobe Connect has numerous other features, text and audio were all that this research required to complete the online interviews, as no sharing of documents or applications was required, and neither was videoing the participants to capture their faces or gestures. Also, the use of the internet and the software required did not involve online environments such as virtual worlds or games, and thus the technology was simply a medium for data collection rather than a phenomenon requiring examination. Furthermore, it was expected that Adobe Connect would be easy for the participants to use because no experience is needed, and guidance on how to use it was sent prior to the interview.

Ethical issues need to be carefully addressed in e-interview research. In the pilot study, the consent form was signed by the participants, and included the option for participants to consent to have their voices recorded, with participants being informed that this would be used solely for research purposes. A similar process was used to gain consent for the main study. The participants were not asked for their personal data for the interviews because all necessary information about them had already been attained in the survey. They were again informed that this information will only be used for research purposes, will be kept strictly confidential and anonymous, and that they will not be identifiable in any reports or publications. Appendix 3 provides a sample of the invitation email, research information sheet, and the participants' consent forms that were sent to them prior to the interview meeting.

After explaining the reasons for choosing the online interview and producing a full picture of what is needed for a good design, careful preparation was undertaken to ensure that successful online research was conducted. The main study intended to recruit 20–30 faculty members across the university's departments. Baker (1994) stated that a sample size of 10% of the sample size for the actual study is a reasonable number of participants to consider enrolling in a pilot. So, four university teachers (two males and two females) were enrolled in the pilot study. The invitation emails were sent to them via email, as they had agreed in the pilot survey to take part in the pilot interview, and had provided their emails for correspondence. They were asked to

provide a time at which it was convenient for them to participate in an individual online interview and a link to access a private online room was sent to each participant. After receiving the email responses, they were asked to sign a consent form to join the interview. Two links were then sent to them, the first to offer them information and guidance about how to use the software, and the other to enter the online room and join the interview at the time they had chosen.

NVivo qualitative data analysis software was utilised, and a data-driven codes approach used to analyse the results of the open-ended questions. Then the constructed codes produced through the deductive and inductive coding approaches in the interviews were used to understand the context and relationships between the themes (Miles & Huberman, 1994). Further information on this process now follows.

3.5.2.3 Data Analysis Using NVivo

The interview transcripts for each of the participants were organised in Microsoft Word files and were then entered into the QSR NVivo data management programme. In addition, a broad process of data coding and of identifying themes was undertaken. NVivo was utilised in this study for coding and gathering all the references on a specific theme, as well as for bringing the data rows together in a single node (Bazeley and Jackson, 2013).

Node hierarchies were created to move from general nodes to more explicit ones. Here, a pre-constructed top-down coding technique was used to deductively analyse the data sets. Using the conceptual framework for the research, pre-constructed nodes were generated prior to the data analysis, and all pre-existing nodes were organised by category. The nodes were assigned to specific highlighted sections of text, and the same quote could be assigned multiple codes if necessary. For example, when coding interviews about the current and future use of m-learning using NVivo, a parent node called ‘M-learning usage expectation’ was created and, under this, two sub-nodes named ‘current usage’ and ‘future usage’ were then also created. Each of these was given its own nodes, to be divided into positive and negative perspectives relating to

its current or future use. Finally, NVivo codes each quote about the theme under relevant nodes.

On the other hand, a bottom-up approach was utilised for inductive data analysis through reading interview texts and creating codes along the way, which allowed for themes to arise from the data that differed from the pre-constructed codes (Welsh, 2002). The relevant nodes were then assembled and grouped to create categories. For instance, when coding interviews about motivation, NVivo creates two sub-nodes named 'positive motivations' and 'negative motivations', which can then be grouped to invent an additional node named 'teachers' motivations', which then led to them being grouped into a parent node named 'motivation'. Although most nodes' names were generated from the interview data, NVivo coding was used to summarise large text and then to generate a short and descriptive node name.

3.5.2.4 Inductive and Deductive Thematic Analysis Methods

Thematic analysis is an exploration of themes that appear in the text to support essential descriptions of a phenomenon (Daly et al., 1997). Boyatzis (1998) defined a theme as "a pattern in the information that at minimum describes and organises the possible observations and at maximum interprets aspects of the phenomenon" (p. 161). This process was deployed for the objective of reading and re-reading the data, as well as for looking for key words, themes, or ideas in the data that help outline the analysis (Guest et al., 2012). It is a form of pattern recognition within the data, where emerging themes become the categories for analysis (Feredey and Cochrane, 2006). This study deployed a hybrid approach of qualitative methods of thematic analysis, incorporating both the data-driven inductive approach (Boyatzis, 1998) and the theory-driven deductive a priori template of codes approach (Braun and Clarke, 2006).

Figure 3.2 summaries the phases involved in a deductive theory-driven approach to analysis, which proceeds from general to more specific data. In this study, the two theories of technology acceptance (UTAUT and DIT) used in the research's conceptual framework provided the starting point for this approach. After this, the research hypotheses will be tested, and then the data collected from the interviews will

be used to assist in testing the hypotheses, to confirm whether or not the original theory is correct, and to thus arrive at a conclusion (Trochim, 2006).

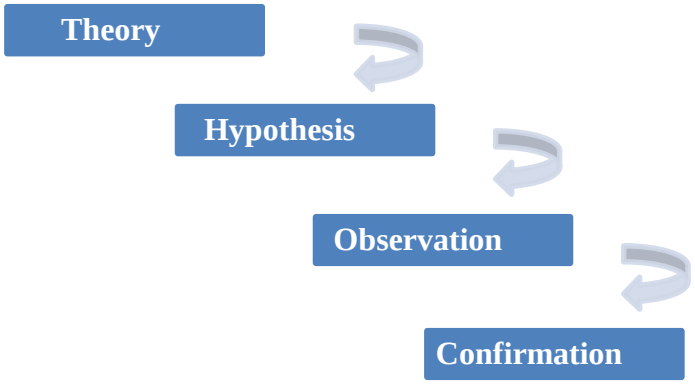

Figure 3.2: The deductive approach (Trochim, 2006)

The deductive method included a template in the form of codes from a codebook to be used as a way of shaping text for later analysis. The codebook was developed a priori, based on the research question and the research's theoretical framework. Thus, the theory-driven code approach includes predetermined specific codes and analytic categories generated from hypotheses, whereas the data-driven code approach derives the code from the data (Guest et al., 2012).

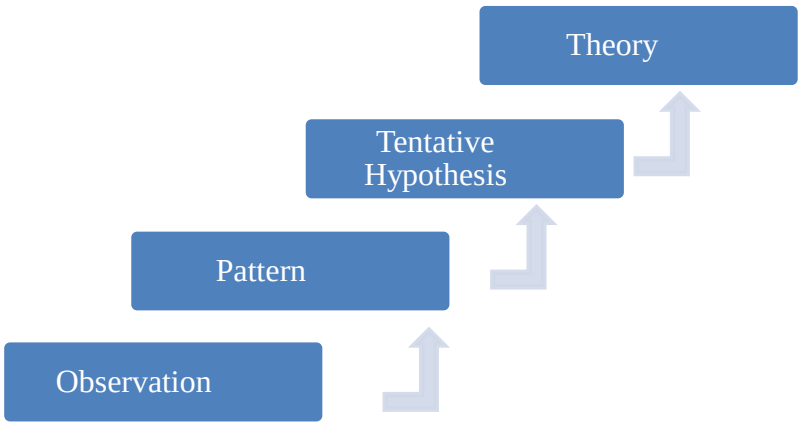

Figure 3.3: The inductive approach (Trochim, 2006)

Figure 3.3 illustrates the phases involved in an inductive data-driven approach, starting with the data analysis of the interviews in order to detect patterns, then articulating some tentative hypotheses, before finally working to develop conclusions or theories (Trochim, 2006). Hence, themes from the inductive approach were developed based on the participants' ideas and interview transcripts on particular issues, relating to the interests and focus of the research. Codes were then established to symbolise the themes and associated to raw data as summary markers for later analysis (Guest et al., 2012).

Although inductive and deductive approaches differ, they can also be complementary to each other. This study initially planned to utilise a deductive method alone, but through data analysis it was discovered that an inductive approach was also needed to help to expand on and illuminate the meaning of the findings, as well as to generate new themes that differed from the theoretical constructs (ibid). Hence, a hybrid qualitative approach consummated the research hypotheses and questions, integrating the views of social phenomenology with the process of deductive thematic analysis, and allowing the use of inductive coding to enable themes to emerge directly from the data. In addition, incorporating both the data-driven inductive approach and the theory-driven deductive one demonstrated a rigorous use of thematic analysis to enrich the qualitative data analysis (ibid). Taking advantage of each approach also helped to provide a wider understanding of teachers' acceptance of the use of m-learning. Although the theories and hypotheses could be used to determine most of the themes in the deductive data analysis, some new patterns in the interview data were found that might reveal information about the adoption of m-learning that could be inductively analysed.

3.6 The Ethics

Data protection procedures will be adhered to at all stages of the research. Participation in the research was voluntary at all stages, and confidentiality and anonymity will be protected. To ensure anonymity, the participants' names are not included. All the

survey data was transferred to an external hard drive, which was accessible to the researcher only. This data was used within and for this research alone, was kept confidential, and will be erased two years after the research is completed.

A further ethical aspect of this research is ensuring that no faculties are disadvantaged by their participation or non-participation in the research, and to acknowledge them for their help and time in participating. Ethical approval was obtained before conducting the study (Ethics reference: AREA 12-075). This research poses no risk to the participants, however, because they have the right to participate and/or withdraw at any time in the process. Also, the questions that will be asked are clear, answerable and not of a sensitive nature.

3.7 Conclusion

This chapter has outlined the research design for the studies conducted in this thesis, together with the methodologies that will be used, and their features and limitations. As illustrated, the studies involve online mixed methods combining quantitative and qualitative research consisting of online questionnaires and online interviews. A detailed description of how these methods were facilitated in the studies and how the collected data was analysed has been provided. The next two chapters provide details of both the quantitative and qualitative results and the data analysis process for each, respectively.

Chapter 4 : Quantitative Results

The purpose of this study is to explore the perceptions and attitudes of teachers within King Abdulaziz University in Saudi Arabia regarding various factors that may influence their current and future use of mobile devices for teaching and learning purposes. This chapter provides a summary of the quantitative data analysis of the findings, whilst the open-ended questionnaire questions and the interview data are presented in the following chapter.

As stated in the research methodology chapter, the survey data were analysed using the Statistical Package for the Social Sciences (SPSS) via descriptive statistics, frequencies, Chi-square tests, independent t-tests, and binary logistic regressions. The independent t-test was used to compare mean scores between two groups of independent variables (Current and Future Use (CFU)) and continuous dependent variables (performance expectancy (PE), effort expectancy (EE), social influence (SI), facilitating conditions (FC), perceived trialability (PT), resistance to change (RC), and perceived social norms (SN)), and the assumption that the variants for the two groups were equal (i.e., significant, at a level of greater than .05) was tested (Pallant, 2013). Chi-square tests were also utilised to compare mean scores between two categorical variables, whilst binary logistic regression tested the combined effect of all the predictors, and was used to estimate the unique independent effect (CFU) of each predictor (PE, EE, SI, FC, PT, RC, and SN). Although the binary logistic regression test provides all such reach data, the Wald chi-square test and Sig. column, the p-values of the coefficients are the main data that should be considered (Hosmer and Lemeshow, 2000). In addition, the binary logistic regression models the relationship between a dependent and one or more independent variables, and allows the fit of the model to be examined, as well as the significance of the relationships between the dependent and independent variables that are being modelled (ibid).

The survey required participants to respond to several items relating to their attitudes to, behaviour of acceptance towards, and utilisation of m-learning using a five-point Likert scale, ranging from strongly disagree (1) to strongly agree (5). Table 3.2 in Chapter Three details the items for which the attributes and obstacles of acceptance and the use of m-learning were examined for each construct. Mean composite scores were calculated for each of the following seven subscales: performance expectancy, effort expectancy, social influence, facilitating conditions, trialability, perceived social norms, and resistance to change. The statistics for each of these seven factors will be presented later in this section. The resulting computing scores for the seven constructs were used to identify the normality of the data in order to decide what type of test should be used (a parametric or a non-parametric test). The data is considered to be normally distributed when histograms, normal Q-Q plots, or boxplots visually indicate that the data is approximately normally distributed, or the skewness and kurtosis z-values are within the span -1.96 to +1.96 (Doane & Seward, 2011). This process was repeated in the analysis process for each research question. The first part of the following section commences by examining the internal consistency reliability of the seven constructs and providing the relevant demographic information, and then proceeds with the data analysis of the research questions.

4.1 Internal Consistency Reliability

Cronbach's alpha coefficient was used to calculate and assess the level of the internal consistency reliability of the seven constructs. The reliability coefficients of each of the constructs are presented in Table 4.1. They revealed that performance expectancy, effort expectancy, facilitating conditions, perceived social norms, and resistance to change all demonstrated sufficient levels of internal consistency reliability (with an alpha coefficient greater than 0.70), whilst social influence and trialability had lower levels of reliability (0.669 and 0.603 respectively).

Subscale	No. of items	Cronbach's Alpha
PE	4	0.810
EE	3	0.892
SI	4	0.669
FC	4	0.747
PT	2	0.603
PSN	3	0.702
RC	4	0.766

Table 4.1: Internal Consistency Reliability for Mobile Learning Subscales

Two IT infrastructure items were included in the facilitating conditions construct, which focused on the lack of ICT infrastructure in Saudi universities as obstacles to the integration of new technology into their approaches to teaching and learning. In the reliability test of the pilot survey, the two IT infrastructure items had a Cronbach's Alpha coefficient of 0.842. However, in the mean survey reliability test, those two items had a negative reliability, with a Cronbach's Alpha coefficient of 0.328. Hence, the two IT infrastructure items were excluded.

4.2 Demographic Characteristics

279 faculty members participated in the study, either in an online or in a printed format, as less than 200 faculty respond to the online survey and thus the back-up plan was deployed to maximise the response rate. 165 (59.1%) of the respondents were female and 114 (40.9%) male. KAU has 1340 male teaching staff (152 full professors, 158 associate professors, 363 assistant professors, 225 lecturers, and 442 teacher assistants) and 1884 female teaching staff (74 full professors, 213 associate professors, 371 assistant professors, 458 lecturers, 768 teacher assistants) (MOE, 2015). As stated

earlier (point 3.5), 114 completed questionnaires were required for the sample of the research population of 3,224 teaching staff to be representative, where this sample balances the characteristics of faculty members within KAU. Hence, the online survey was monitored in order to check that a reasonable balance of male and female participants was attained, as well as to ensure that the sample represented the participants' different personal characteristics, such as their academic degrees.

It is worth noting that ensuring that the research sample was representative of the population was based on two available variables – gender and academic position – as the age and teaching experience of the participants were not existed. From the total number of respondents, 165 were female and 114 male, which both represent nearly 8–9 % from their respective gendered populations. Figure 4.3 shows the percentages for the academic degrees held by the participants, and it was found – after looking at the percentages of the whole population and the sample – that the sample consistently represented the population.

The survey sample was assured to be representative to include all age groups, faculty with different academic degrees and positions, and with a broad range of teaching experiences to ensure the reliability and to avoid bias. Hence, these variables were all taken into account in the back-up plan of distributing the printed questionnaire to the faculty and departments that had provided the fewest responses.

Figure 4.1 shows the percentages of the participants' age groups, which consist of five age groups ranging from under 30 (n=39), 30–39 (n= 78), 40–49 (n=66), 50–59 (n=80), and 60 or over (n=16). The demographic data also comprises the faculty members' academic degrees, their position or title, and their years of teaching experience. Figures 4.2, 4.3, and 4.4 illustrate the percentages of these variables respectively. All these data were then later triangulated and tested to answer the third research question.

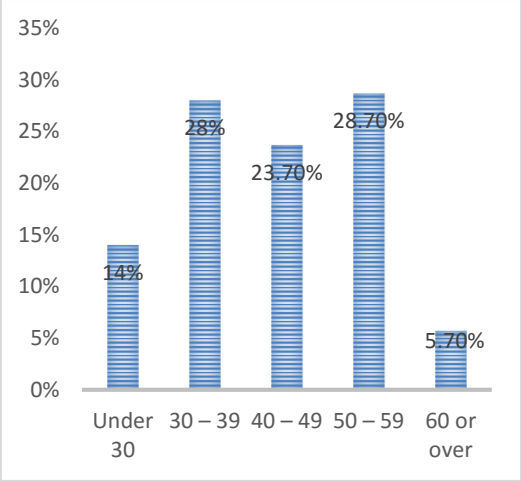

Figure 4.1: Percentage Breakdowns of Participants' Age Groups

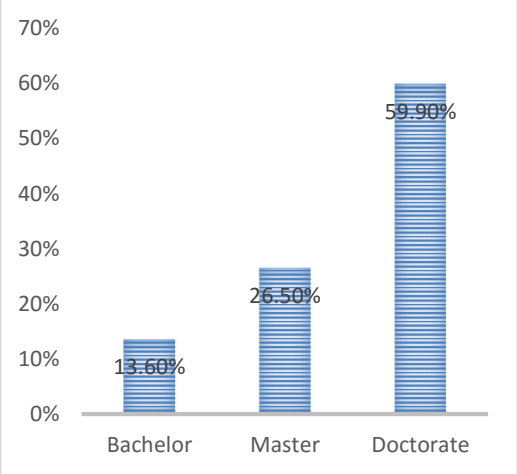

Figure 4.2: Percentage Breakdowns of Participants' Academic Degrees

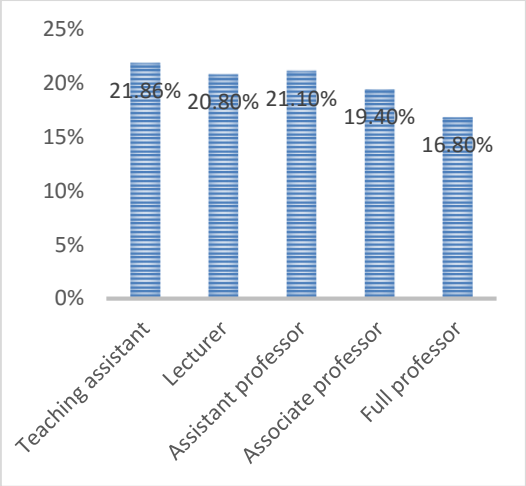

Figure 4.3: Percentage Breakdowns of Participants' Positions

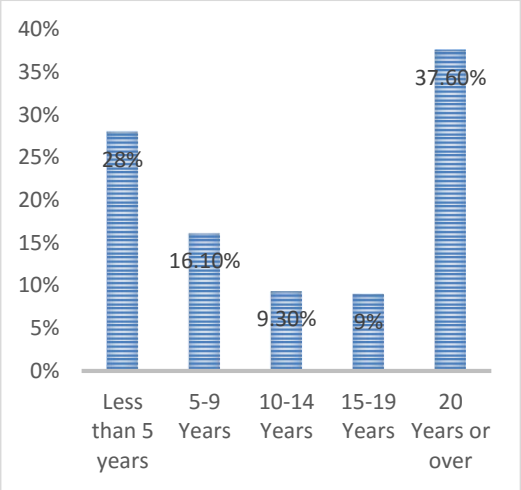

Figure 4.4: Percentage Breakdowns of Participants' Teaching Experience

In relation to their mobile usage patterns, the faculty members who took part in the survey were asked about frequency with which they used mobile devices and the types they used, as well as their level of experience with such technology. The data presents the percentage of respondents who owned and carried their mobile devices daily. All of the respondents owned at least one device, with 251 of the respondents (90.0%) reporting that they used their handheld device every day, and 23 (8.2%) stating that they use their handheld device almost daily for general use.

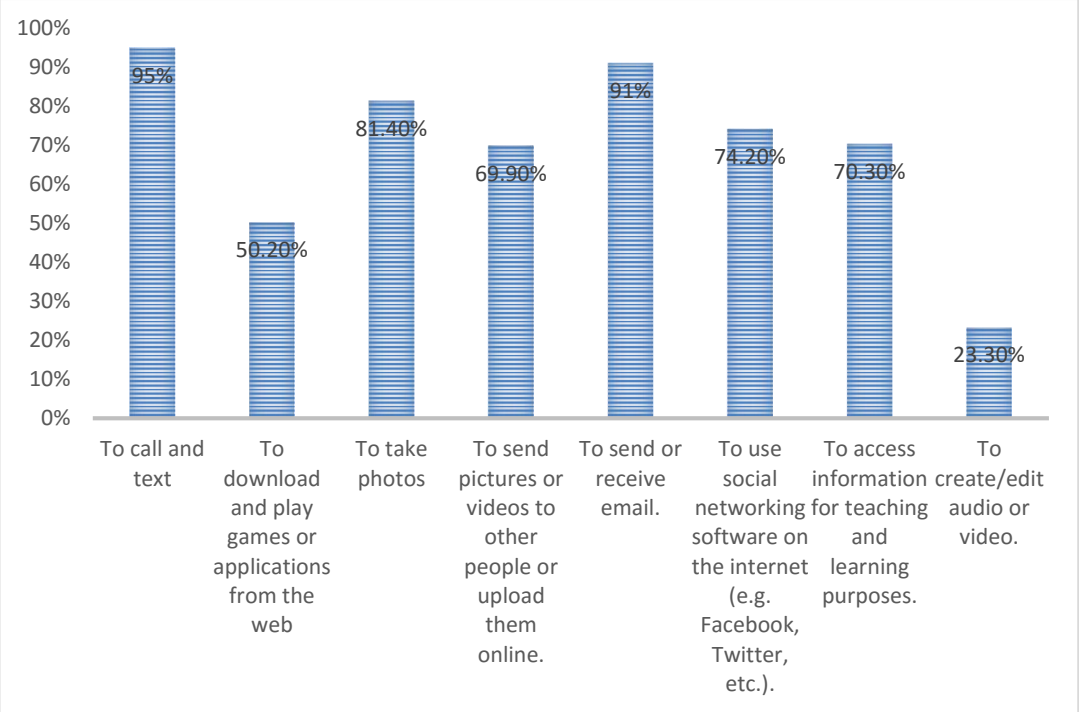

Figure 4.5: Percentage Breakdowns of participants' mobile device usage

In addition, a large majority of the participants (270/279 or 97.8%) reported having a smart mobile device with high functionality (for example, iPhones and Android phones) and PC tablets (for example, iPads and Galaxy Tablets) and/or laptops (for example, Hewlett Packard, Toshiba, Apple, etc.). The participants were asked to check the boxes that matched their experience and skills in using mobile devices. The data in Figure 4.5 illustrates that most of the faculty members were confident in using their mobile devices for several different functions, with calling and texting (99.6%), sending or receiving emails (91%) and taking photos (81.4%) being the activities that most used them for. In addition, almost three quarters of the teachers expressed their ability to use social networking software – for example, Facebook, Twitter, etc. (74.2%), to access information for teaching and learning purposes (70.3%), and to send pictures or videos to other people or to upload them online (69.9%). However, less than a quarter of the respondents reported the ability to create and/or edit audio and video via their mobile devices (23.3%). For data analysis purposes, the teachers' skills in using mobile devices were combined to give a new value to represent the

skills that were chosen. The reliability test of the eight mobile device use skills indicates that Cronbach's Alpha is greater than 0.7 (0.740).

4.3 Data Analysis for the Main Research Question

How do Saudi social norms influence the adoption of mobile learning by faculty members in Saudi higher education, and is gender an important factor for its uptake within this constituency?

It is worth mentioning that this question was designed to be answered in two ways – qualitatively and quantitatively. The qualitative part will be based on the analysis of the interview data relating to this question. If Saudi social norms have a significant effect on faculty perceptions towards the use of m-learning, further explanations will need to be sought from the interviews to fully understand this phenomenon. Hence, the hypotheses to test are as follows:

$H1_0$: Saudi social norms have no significant effect on the perceptions of faculty members regarding the use of mobile learning.

$H1_A$: Saudi social norms have a significant effect on the perceptions of faculty members regarding the use of mobile learning.

Also:

$H2_0$: The influence of Saudi social norms shows no statistically significant difference between male and female users of mobile learning.

$H2_A$: The influence of Saudi social norms shows a statistically significant difference between male and female users of mobile learning.

4.3.1 Analysing the Influence of Social Norms on the Use of m-learning

The social norms mean average for its three items was computed, and the resulting computing scores were used to identify the normality of the data. The distribution of scores was normal, with no detection of any outlier data. The assessment of 'intention to use m-learning' measures faculty members' attitudes towards 'the current and future use of m-learning', and does so based on the choice of one of three statements to describe these intentions. Participants were thus split into three groups – Group 1:

the participants who currently do not use m-learning and do not want to use it in the future (*M*= 3.769, *SD*= .956, *n*= 13); Group 2: the participants who currently do not use m-learning but want to use it in the future (*M*= 3.415, *SD*= .885, *n*= 143); and Group 3: the participants who currently use m-learning and want to continue using it in the future (*M*= 2.986, *SD*= .954, *n*= 123). However, due to the small number of participants in Group 1 (n=13), it is possible that there would be significant differences in the statistical tests, which could bias the results. Hence, Group 1 and Group 2 were joined together. Although this mixes people with different intentions for using m-learning in the future, all the members of this combined group had similar intentions regarding their current uses of m-learning. Therefore, respondent-behaviour, which is the outcome variable, consists of two categories of intention to use m-learning: Group 1 and Group 2 became Group1 and Group 3 became Group 2 (see Table 4.2).

Group No.	**Items**	**N**
Group 1	I have not used mobile learning before and I will not use it in the future, or I have not used mobile learning before but I will use it in the future.	156
Group 2	I use mobile learning and I will continue using mobile learning with my students in the future	123
Total		279

Table 4.2: Descriptive Statistics of the Current and Future Use of M-learning.

An independent t-test was then conducted between Group 1 (*M*= 3.444, *SD*= .893, *n*= 156) and Group 2 (*M*= 2.986, *SD*= .953, *n*= 123) in relation to responses regarding social norms to evaluate the null hypothesis that Saudi social norms have no significant effect on the current and future intentions that faculty members have regarding the use of mobile learning (*N*= 279). The results of the data analysis illustrated, firstly, that the Sig. value of the homogeneity of variances test (i.e. Levene's Test for the Equality

of variances) was greater than .05 (.780), which means that it did not violate the assumption of the homogeneity of variances, and that the first line of results in the table should be recorded. Moreover, the independent t-test results demonstrated that there was a statistically significant difference at the $p = .000$ level (t (277) = 4.127) in social norms scores between the two groups, hence, $H1_a$ is accepted. Cohen (2013) classifies a .01 eta squared value as representing a small effect, a .06 value as representing a medium one, and .14 as representing a large effect. The effect size (strength of association) calculated using eta squared was .06, thus revealing a statistical significance, with the actual difference in mean scores between the groups showing a medium effect.

As further data analysis of the influence of social norms was needed, an independent t-test was conducted between Groups 1 and 2, and the three social norms items examined in the research to determine how influential they were in comparison to each other. Table 3.2 defines the three social norms that were used to examine the teachers' attitudes towards adopting m-learning.

SN items	**t**	**Sig. (2-tailed)**	**Mean Difference**	**Std. Error Difference**
SN1	1.537	.125	.213	.138
SN2	4.894	.000	.689	.141
SN3	2.995	.003	.428	.143

Table 4.3: Independent Samples T-test of the Social Norms items

The results in Table 4.3 indicate that social norms items 2 and 3 were statistically significant at the $p < .05$ value ($p = .000$, $p = .003$ respectively). This means that Group 1 strongly agreed that the negative effects of Saudi norms effected their willingness to use m-learning, including social norms item 2 (SN2): the misuse of mobile devices by students, and social norms item 3 (SN3): the privacy of women in Saudi society. These two social norms items thus significantly influenced Group 1's use of mobile learning,

who reported not wanting to use it currently although they may want to use it in the future. Further information is urgently needed to understand why differences in the perceptions of faculty members regarding social norms exist, and such results could shape some of the interview questions.

4.3.2 Analysing Gender Differences and Social Norms

In relation to the second half of the main research question – whether gender differences are an important factor in faculty members' adoption of m-learning – the data on females and males in relation to social norms scores indicated that the distribution of scores is approximately skewed for both groups. The skewness statistics for the males (skewness stat = -.250, SE = .226 and Kurtosis = -.023, SE = .449) and the female (skewness stat = .066, SE =.189 and Kurtosis = -.354, SE = .376) confirm a slight skew. This suggests that a dependent variable (social norms) is approximately normally distributed for each category of an independent variable (gender). Hence, a parametric test was needed. An independent sample t-test was conducted between male and female groups and the data on the influence of the social norms construct to determine whether there was a significant difference between male and female faculty members' uses of mobile learning in relation to Saudi social norms. The descriptive data scores for social norms' influence on the use of mobile learning for males and females were M = 3.237, SD = .893, n= 114 and M = 3.247, SD = .984, n= 165 respectively. The initial results reveal no significant differences (p = .582) between the scores of males and females regarding the influence of perceived social norms on the use of m-learning.

The t-test results suggest that there were no significant differences between males and females relating to the effect of perceived social norms on the use of m-learning (t (277) = -.083, p < .088; see Table 4.4). The results suggest that Hypothesis $H2_0$ should be accepted. However, the data analysis indicated that perceived social norms have significantly influenced both groups.

	Descriptive Data		Levene's Test for Equality of Variances		t-test for Equality of Means			
Dependent Variable	**Mean**	**Std. Deviation**	**F**	**Sig.**	**t**	**Sig. (2-tailed)**	**Mean Difference**	**SE of Difference**
Social Norms	3.243	.946	2.94	.088	-0.083	.934	-0.00962	.11548

Table 4.4: Descriptive Data and Independent Sample t-tests on Social Norms in relation to Gender

4.3.3 Conclusion

This section has sought to answer the main research question. Independent t-tests were conducted to examine the influence of the Saudi social norms construct on faculty members' intentions regarding their current and future use of m-learning, as well as on whether there were differences in their impacts on male and female faculty members. The findings indicate that social norms have an effect on faculty members' perceptions about the use of mobile learning. Group 1 and Group 2 differed significantly in terms of their agreement about the influence that social norms have on their intentions to use m-learning, both currently and in the future, and therefore the independent t-test results support the rejection of the null hypothesis. However, Saudi social norms show no statistically significant difference in their impact on male and female uses of mobile learning. Thus, further information will be required from the interviews to clarify this issue, and this will be discussed in the next chapter.

4.4 Data Analysis for the Second Research Question

Which of the following dependent variables (if any) are significant predictors of the behavioural intention to use mobile learning: performance expectancy, effort expectancy, social influence, facilitating conditions, perceived trialability, Saudi social norms, and resistance to change?

The hypotheses to test are presented in 1.5. The purpose of this research question was to investigate which factors are predictors of participants' attitudes towards accepting or rejecting the use of m-learning in their professional practices. The measure of intentional use of m-learning assesses faculty members' attitudes towards using m-learning both currently and in the future and, as noted previously, is based on two categories of responses on intentions to use m-learning. The use of m-learning by respondents both now and in the future might be influenced by one or more predictor variables, comprising performance expectancy (PE), effort expectancy (EE), social influence (SI), facilitating conditions (FC), perceived trialability (PT), resistance to change (RC), and perceived Saudi social norms (SN) (continuous variables). In addition, the research is interested in discovering the impact of each factor on faculty intentions to use m-learning.

4.4.1 Normality Tests

As in the discussion of the main question, the data were screened for outliers prior to analysis. Normality tests were conducted between the seven factors and the two groups of intention to use m-learning, and the results indicated an approximately normal distribution of the data for each construct. The descriptive statistics for the criterion and predictor variables are listed in Table 4.5.

4.4.2 Exploring the Influence of Each Construct

After the normality of the data was confirmed, independent t-tests were then conducted between each construct and the two groups that had been split in terms of their different intentions to use m-learning, so that the impact of each construct on teachers' attitudes to using m-learning now and in the future could be explored. There were statistically significant differences between Group 1 and Group 2 at the $p < .05$ level for all the constructs ($p = .000$ for all the constructs). The effect size (strength of association) was calculated[4] (eta squared PE = 0.16, EE = 0.14, SI = 0.16, FC= 0.18,

[4] For the independent samples T-test, Cohen's *d* is determined by calculating the mean difference between two groups, and then dividing the result by the *pooled* standard deviation [Cohen's $d = (M_2 - M_1) / SD$] (Becker, 1999).

PT = 0.2, SN = 0.08, RC = 0.089), and was strongly statistically significant for each construct, with actual differences in mean scores being seen between groups. Thus, all alternative sub-hypotheses ($H4_A$, $H5_A$, $H6_A$, $H7_A$, $H8_A$, $H9_A$) were accepted.

	Descriptive Data		**Levene's Test for Equality of Variances**		**t-test for Equality of Means**			
Dependent Variable	**Mean**	**Std. Deviation**	**F**	**Sig.**	**t**	**Sig. (2-tailed)**	**Mean Difference**	**SE of Difference**
PE	3.924	.648	5.582	.019	-5.775	.000	-.427	.072
EE	3.910	.739	14.745	.000	-5.423	.000	-.460	.082
SI	3.347	.754	2.058	.153	-5.879	.000	-.505	.085
FC	3.375	.806	23.275	.000	-6.314	.000	-.575	.087
PT	3.885	.767	12.552	.000	-7.004	.000	-.598	.083
RC	3.824	.749	10.216	.002	-4.026	.000	-.354	.085
SN	3.243	.947	.078	.780	4.127	.000	.458	.112

Table 4.5: Descriptive Statistics and Independent T-tests for the Seven Constructs and the Two Groups of Intention to Use M-learning

4.4.3 Exploring the Combined Influence of all Constructs

The data produced by the t-tests indicates that all the seven constructs were statistically significant and that they had direct impacts on faculty members' perceptions about using m-learning, both now and in the future. However, whether the differences in intention between Group1 and Group2 are produced by a combination of the seven constructs or by each factor individually needed to be investigated to reveal how these factors caused differences in behavioural intentions. Thus, a binary logistic regression

was conducted in order to test the combined effect of all predictors among the two groups for current and future use of m-learning, and to estimate the unique independent effect of each potential outcome predictor (PE, EE, SI, FC, PT, RC, and SN). An important feature of the binary logit model is that it estimates a whole indication of how well the model fits (Pallant, 2013). Based on the test's output, the full model containing all the predictors was statistically significant, x^2 (7, N = 279) = 77.708, p = .000, indicating that the model was able to differentiate the respondents according to which factors influenced their intentions to adopt m-learning. The model, as an overall account, identified the variance in intentional use of m-learning as being between 24.3% (Cox and Snell, R square) and 32.6% (Nagelkerke, R square), and accurately identified 70.3% of faculty members' intentions to use m-learning.

The Constructs	**B**	**Std. Error**	**Wald**	**Sig.**	**Exp(B)**
PE	.102	.328	.096	.757	1.107
EE	-.178	.302	.348	.555	.837
SI	.431	.256	2.819	.093	1.538
FC	.538	.262	4.198	.040	1.712
PT	.736	.252	8.560	.003	2.088
SN	-.622	.159	15.332	.000	.537
RC	.297	.233	1.619	.203	1.346

Table 4.6: Binary Logistic Regression of the Second Research Question

The results of the Wald test provided in Table 4.6 show that only three constructs had a unique and statistically significant contribution to the model (FC, PT, and SN). The strongest predictor of the intentional use of m-learning (CFU) was perceived trialability (PT) (p = .003), recording an odds ratio of Exp (B) = 2.088, which indicates

that a faculty member who has a current and future intention to use m-learning is two times more likely to perceive m-learning as trialable than one who has no current intention to use it. Similarly, facilitating conditions (FC) has an odds ratio of 1.712, which means that a faculty member who perceives there to be ample facilitating conditions for using m-learning (for example, the availability of resources and knowledge necessary to use mobile learning, the existence of a dedicated team at the university to help, and the encouragement of university administration) is 1.7 times more likely to accept and use m-learning now and in the future than one that perceives there to be a lack of facilitating conditions.

The most significant predictor of the intention to use m-learning (CFU) was perceived social norms (SN) (p = .000). However, the odds ratio was less than 1 here (Exp (B) = .537), which indicates that a faculty member who is more influenced by social norms is less likely to intend to use m-learning now and in the future. In addition, the B values in the first column of Table 4.6 signpost the direction of the relationship. For instance, a positive B value for performance expectancy (B =.102) indicates that when a person perceives m-learning to be useful they are more likely to use m-learning now and in the future, whilst a negative B value of social norms (B = -.622) indicates that the more social norms influence respondents, the less likely they are to intend to use m-learning now or in the future.

4.4.4 Conclusion

The first part of this section found that all seven constructs were statistically significant for the behavioural intention to use mobile learning and, thus, the alternative sub-hypotheses were accepted. As the second research question aims to examine the combined effect of all predictors and to estimate the unique independent effect of each of the potential outcome predictors on the two groups in relation to current and future use of m-learning, a binary logistic regression was then conducted to discern these more detailed effects. It indicated that facilitating conditions, perceived trialability and perceived social norms were significant predictors of participants' attitudes towards using mobile learning both now and in the future. Therefore, the alternative hypothesis (H3A) was accepted. In other words, facilitating conditions, perceived trialability and

perceived social norms were more likely than other factors to influence respondent preferences in using m-learning both now and in the future.

4.5 Data Analysis for the Third Research Question

Is there a statistically significant relationship between faculty members' personal characteristics (including gender, age, academic qualifications, academic position, years of teaching experience, mobile device usage) and their perceptions towards using mobile learning?

The following hypotheses need testing:

$H10_0$: There is no statistically significant relationship between faculty members' personal characteristics (including gender, age, academic qualifications, academic position, years of teaching experience, mobile device usage) and their perceptions towards using mobile learning.

$H10_A$: There is a statistically significant relationship between faculty members' personal characteristics (including gender, age, academic qualifications, academic position, years of teaching experience, mobile device usage) and their perceptions towards using mobile learning.

4.5.1 Normality Tests

The normality tests results showed an approximately normal distribution of age groups (M= 2.84, SD= 1.15), academic positions (M= 2.99, SD= 1.43), and mobile usage skills (M= .701, SD= .239), and thus assured the normality of the data. However, the results suggested that current and future intentions to use in the m-learning variable is approximately skewed for some independent variables, including gender (M= 1.59, SD= .492), academic qualifications (M= 2.47, SD= .724), and years of teaching (M= 3.12, SD= 1.69), although no outliers were detected.

4.5.2 Exploring the Influence of Each Variable

Firstly, it was crucial to determine whether there are significant differences in the mean scores for each dependent variable across Group1 and Group2 in relation to current and future use of m-learning. Hence, the Chi-square test (for exploring the relationship between two categorical variables) and independent t-tests (for exploring the relationship between one categorical variable and continuous variables) were conducted, and the results are presented in Table 4.7 below.

Dependent Variable	**Sig. (2-sided)**
Chi-square Test	
Gender	.582
Independent T-tests	
Age	.868
Academic Qualifications	.425
Position	.993
Years of teaching	.943
Mobile device usage	.018

Table 4.7: Chi-square Test and Independent T-tests of the Variable

The findings of the statistical tests shown in the table above indicate that mobile device usage skills were the only statistically significant demographic variable on faculty intentions to use m-learning. It is argued that the overall impact of all the independent variables in the following test leads to a similar conclusion.

4.5.3 Exploring the Combined Influence of the Variables

Binary logistic regression was used to demonstrate the significant predictors of others variables in Group1 and Group2 regarding the current and future use of m-learning.

This regression was conducted in order to examine the overall impact of each personal characteristic on the intention to use m-learning. In a similar way to the process undertaken to answer the second research question, the binary logistic regression test checked the overall Model Fitting. The Hosmer and Lemeshow test provided a chi-square of 4.307 with a p-value < .828, which determined that our model as a whole does not significantly fit with all suggested predictors, and identifying only 56.6% of cases.

The Variables	B	Std. Error	Wald	Sig.	Exp(B)
Gender	.328	.267	1.507	.220	1.389
Age	.004	.205	.000	.986	1.004
Academic Qualifications	-.503	.299	2.839	.092	.605
Position	.227	.193	1.383	.240	1.255
Years of Teaching	.075	.138	.292	.589	1.078
Mobile Skills	.225	.075	9.045	.003	1.252

Table 4.8: Binary Logistic Regression test for the second research question.

Based on the results of the binary logistic regression presented in Table 4.8 (above), mobile usage skills was the only variable to contribute significantly to the model, with $p < .05$ ($p = .003$). This indicates that a person's decision to use m-learning now and in the future is influenced by their ability to use it. An odds ratio Exp (B) = 1.252 was recorded, which indicates that the more skilled a person is in using mobile devices, the more likely he or she is to intend to use m-learning now and in the future. The results indicated that other personal characteristics do not influence the respondents' intention to use m-learning now or in the future.

4.5.4 Conclusion

The first part of this section found that mobile usage skills was the only variable that was statistically significant in relation to the behavioural intention to use mobile learning. However, as this part of the research aims to test the overall impact of all the independent variables of each of the potential outcome predictors, binary logistic regression was also conducted, and indicated that mobile usage skills was the only variable to be a significant predictor of participants' intentions to use mobile learning now or in the future. Thus, the alternative hypothesis ($H10_a$) is accepted.

4.6 Additional Information

This section provides additional data analysis in order to establish that all the relationships and differences among the participants were fully investigated. Independent t-tests and one-way ANOVA tests were conducted on each independent variable – gender, age, academic qualifications, position title, years of teaching experience, and mobile device skills – for each of the seven continuous constructs (see Table 4.9).

Dependent Variables	**Gender**	**Age**	**Academic Qualifications (Degree)**	**Academic Position**	**Years of Teaching Exp.**	**Mobile Device Skills**
PE	.342	.104	.003	.038	.008	.000
EE	.604	.044	.046	.295	.092	.056
SI	.855	.560	.542	.984	.277	.014
FC	.347	.675	.545	.545	.615	.084
PT	.803	.076	.150	.496	.042	.076
SN	.934	.066	.039	.035	.369	.676

RC	.257	.021	.042	.062	.010	.026

Table 4.9: Independent T-tests and one-way ANOVA Tests on Independent Variables for each of the Seven Constructs

In addition to assuring the Homogeneity of Variances assumptions, these two tests also revealed very significant information. The results showed that EE and RC were affected by age; PE, EE, SN and RC were all influenced by level of academic qualification; and PE and SN were influenced by the academic position or title. In addition, PE, PT, and RC were all influenced by years of teaching experience, whilst PE, SI and RC were influenced by mobile device usage. However, gender was not found to make any difference within any of the constructs. Thus, these results partially support the alternative hypothesis below.

$H11_A$: The seven constructs (performance expectancy, effort expectancy, social influence, facilitating conditions, perceived trialability, resistant to change, and social norms) are mediated by faculty members' personal characteristics (including gender, age, years of teaching, academic position, mobile device usage).

Post Hoc Tests were used to determine where the differences occurred. There was a statistically significant difference in Effort Expectancy scores when $p < .05$ ($p = .035$) between the 30–39 age group and the 50–59 age group, with the latter group perceiving m-learning as not being easy to use. Moreover, the 50–59 age group produced a more statistically significant result ($p = .015$) regarding resistance to change than the under 30 age group. Figure 4.6 shows the relationships between the factors that influenced by the demographic data.

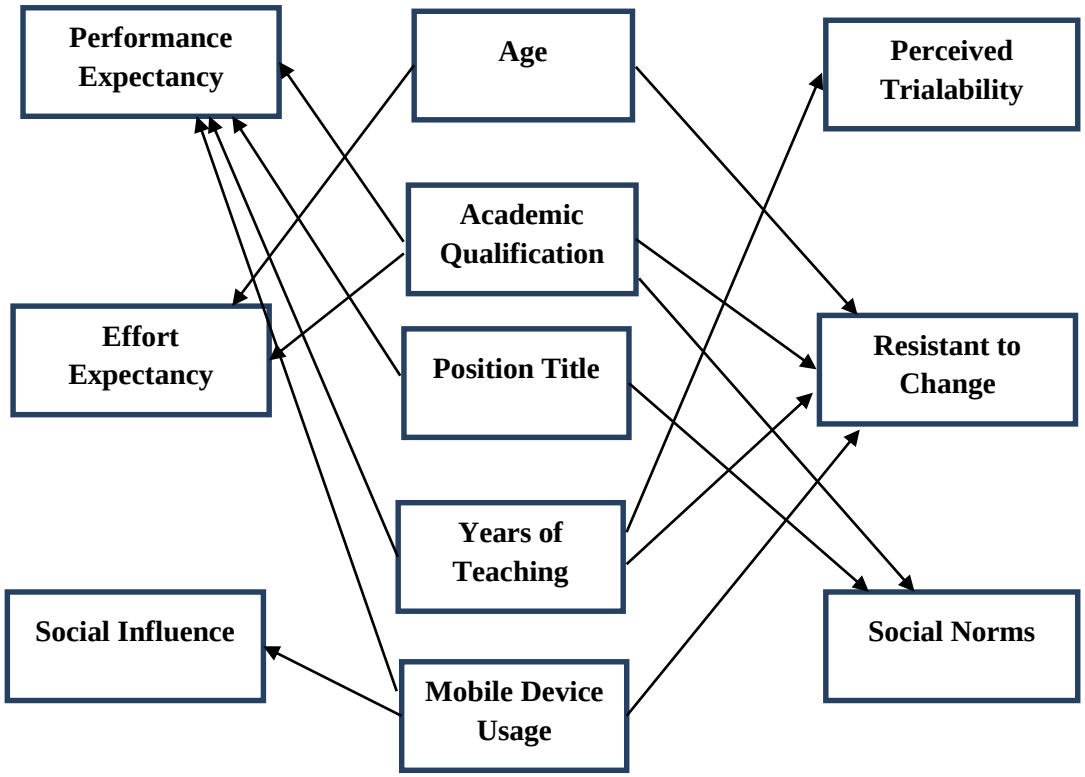

Figure 4.6: The Factors Influenced by Demographics

With respect to academic qualifications, there was a statistical significance in the PE scores between participants who held a doctoral degree and those who held bachelors and masters degrees. The result indicates that the participants holding bachelors ($p = .014$) or masters degrees ($p = .033$) perceived m-learning to be a more useful tool for teaching and learning than those holding doctoral degrees. In addition, there were marked differences in EE between faculty members who held doctoral degrees and those who held masters degrees, and this indicates that the group that have masters degrees recognise the ease of using m-learning more than the other group. Interestingly, teachers with bachelors degrees differed significantly from those with doctoral and masters degrees in terms of social norms, at $p < .05$ ($p = .017$, $p = .038$, respectively). That is, teachers with bachelors degrees were not influenced as much by Saudi social norms as those holding higher degrees. Finally, the doctoral faculty members were significantly more likely to resist change than faculty members with master degrees, at p value = .032.

Statistically significant data was also revealed about the relationship between performance expectancy and academic position. Differences were recorded between teaching assistants and lecturers on the one hand, and associate professors and full professors on the other, with the first two groups being more highly aware of the usefulness of m-learning than the latter two. Moreover, teaching assistants were less influenced by social norms than full professors, at p = .042. The data analysed, based on years of teaching experience, shows that the group of participants who had less than five years teaching experience perceived m-learning to be more useful (p = .004) and trialable (p = .029), and were more likely to change from traditional methods of teaching (p = .013) than the group that had 20 years or more teaching experience, whereas there were no significant differences among other teaching experience groups in relation to the seven constructs.

PE, SI and RC were influenced by mobile device usage. The results show that the group of participants who had good skills in using some functions of mobile devices, such as sending or receiving emails, accessing information for teaching and learning purposes, and creating or editing audio and video (p=013, p=.004, p=.046 respectively) perceived m-learning to be more useful than those that were less skilled in their use. The skill for accessing information for teaching and learning purposes was the most influential one in this area, having significant coefficients with respect to SI (p=.002) and RC (p=.003). That means that the participants who had low skills in searching for information for professional practices were less likely to be socially influenced by their peers or by students in using m-learning, and were also more resistant to change from the use of classical teaching to the use of m-learning.

4.7 Testing the Correlations between the Seven Factors

The correlations between the seven factors was also a point of interest for this research. Many studies that used UTAUT have explored the correlation between PE and EE, but none of them have explored the correlations between each of the factors. Hence, a Pearson Correlation was conducted to explore these relations.

Model Factors		Performance Expectancy	Effort Expectancy	Facilitating Conditions	Social Influence	Trialability	Resistance to Change	Social Norms
Performance Expectancy	Pearson Correlation		.629**	.540**	.591**	.529**	.511**	.083
	Sig. (2-tailed)		.000	.000	.000	.000	.000	.167
Effort Expectancy	Pearson Correlation			.686**	.483**	.550**	.350**	.158**
	Sig. (2-tailed)			.000	.000	.000	.000	.008
Facilitating Conditions	Pearson Correlation				.528**	.547**	.237**	.081
	Sig. (2-tailed)				.000	.000	.000	.180
Social Influence	Pearson Correlation					.502**	.435**	.007
	Sig. (2-tailed)					.000	.000	.909
Trialability	Pearson Correlation						.356**	.089
	Sig. (2-tailed)						.000	.137
Resistance to Change	Pearson Correlation							-.057
	Sig. (2-tailed)							.345
Social Norms	Pearson Correlation							
	Sig. (2-tailed)							
**. Correlation is significant at the 0.01 level (2-tailed).								

Table 4.10: Correlations between the model constructs

Table 4.10 illustrates that there are strong correlations between most of the constructs. In greater detail, there is a strong positive relationship between PE and the variables EE, FC, SI, PT, and RC – which means that the affect of one variable is strongly

correlated with the affect of the other variables, with Pearson's r = .629, .540, .591, .529, and .511, respectively, at the significant level $p < 0.01$. Similarly, the table above shows the significant positive correlation of EE with FC (r=.686) and PT (r=.550). However, this correlation decreases when it is associated with SI (r=.483) and RC (r=.350). Although FC has strong positive relationships with both SI (r=.528) and PT (r=.547), it has a weak positive correlation with RC (r=.237). Moreover, SI has a relatively strong positive relationship with PT (r=.502), but PT has a medium correlation with RC (r=.435) and a weak correlation with RC at Pearson's r = .356.

However, it seems that SN plays an individual and influential role, with no correlation with any with the above factors. This distinct phenomena needs to be further investigated in the qualitative phase. Thus, the alternative hypothesis was mostly accepted ($H12_A$).

$H12_A$: There are strong correlations between the seven constructs (performance expectancy, effort expectancy, social influence, facilitating conditions, perceived trialability, resistance to change, and social norms).

4.8 Conclusion

The first part of this chapter presented the findings of the quantitative data analysis of the research survey and aimed to answer the main, second and third research questions. Illustrations of the research aims and questions were provided, followed by brief descriptions of how the analysed data was delivered. Moreover, it gave a summary of the participants' demographic data and the reliability results for the seven constructs. The main research question seeks to examine the influence of Saudi social norms on faculty members' intentions to use m-learning, both now and in the future, as well as to test whether it has a different impact on males and females. The results suggested that social norms do indeed have an impact on faculty members' perceptions towards the use of mobile learning, but that there are no significant differences between its impact on male and female faculty members with regard to the use of mobile learning.

In addressing the second research question, the data produced by one-way analysis showed that all of the seven constructs are statistically significant and have a direct

impact on the faculty members' reported intentions to use m-learning, both now and in the future. As the research question seeks to investigate which factor(s) are the best predictors of participants' attitudes towards using m-learning in their professional practices, binary logistic regression was used to ascertain which factors these were, and it was found that facilitating conditions, perceived trialability, and perceived social norms are all statistically significant predictors of the behavioural intention to use mobile learning, with SN being the most significant one. However, the findings from the data analysed to address the third research question revealed that mobile device usage was the only significant predictor from the personal characteristics of faculty members regarding the behavioural intention to use mobile learning, both now and in the future. Additional data was analysed and is explored later in the discussion chapter.

Chapter 5 : Qualitative Results

The primary objective of this study is to understand the factors that influence faculty members' views towards choosing to use mobile devices in their professional teaching practices. As stated earlier, in the Research Methodology chapter, a sequential mixed methods approach was deployed in this study in order to facilitate data triangulation and to increase the validity and understanding of the survey results. The previous chapter described the quantitative data collection methods, provided an analysis of the data, and revealed the main factors that influenced faculty members' perspectives on accepting and using m-learning. Thus, the qualitative part of this research supports the interpretation of the data obtained from the quantitative part.

This chapter is divided into two parts – the first providing the quantitative data from open-ended survey items and the second introducing the interviews phase. A hybrid method was utilised for the analysis process, comprising both theory-driven and data-driven coding approaches. This chapter starts with the analysis of the qualitative part in the survey, and then proceeds to the interview phase to present the interview questions, the pilot study, the reliability and validity of the data, the interview preparation process, and the interview findings and data analysis.

5.1 Open-Ended Questions

The final two survey items were the open-ended questions, designed to provide a space for teachers to freely express individual, nuanced attitudes and perceptions about the attributes of and possible barriers to using mobile learning. They were presented as follows:

- Please give two primary reasons why you would (or would not) use mobile learning in your teaching?
- Please specify how, in your view, you could be encouraged to implement mobile learning in your practice in the future?

Although answers to these open-ended questions were optional, some respondents found that they provided spaces for them to express their perceptions about the use of mobile devices in teaching and learning. Most of the opinions that were expressed related mainly to the research questions and hypotheses.

5.1.1 Categories and Themes

The themes and categories for the qualitative data analysis were derived from the participants' answers to the open-ended questions (Patton, 1990, p. 390). 226 participants (81%) responded to the first open-ended item, and 232 participants (83.2%) provided suggestions about encouraging the use of m-learning in the future. The responses to these items were broken down into several themes which, in turn, were grouped into three categories. Creswell (2008) suggests that the researcher follows a three-stage process for analysing open-ended data, which comprises reading through the responses, creating summaries, and then sorting the data into categories or themes. As a theme could be idea or concept, it should be descriptive (Donaldson, 2011). In addition, the data could be linked to more than one theme simultaneously. For the purpose of consistency, a coding manual was established, listing the names of the themes, providing explanations for how to link a theme to a code, and giving an example or examples for each theme (ibid).

The two survey items were categorised as follows: (a) attributes of m-learning use, (b) barriers to using m-learning, and (c) future encouragement for using m-learning. Each category (see Table 5.1) was divided into different themes through calculating the frequencies of responses for each theme.

Categories	**Themes**	**Frequency***	**Percentages***
Attributes of M-learning Use	Student Enjoyment	202	89.4%
	Pedagogical Awareness	183	81%
	Personally' Identified Issues	6	2.6%

Barriers to Using M-learning	Technical Issues	209	92.5%
	Training Needs	180	79.6%
	Mobile Devices as Distractions	52	23%
	Administrative Issues	43	19%
	Social Norms Issues	41	18.2%
	Student skills barriers	32	14.2%
	Student Ownership Issues	5	2.2%
Future Encouragement on using M-learning	Technical Issues	196	84.5%
	Training Needs	153	66%
	Administrative Issues	39	16.8%
	Social Norms Issues	41	17.7%
* Frequencies and percentages were calculated according to the frequencies of the responses to the open-ended items.			

Table 5.1: Categories and Themes Emerging in Open-Ended Survey Items

5.1.1.1 Attributes of Using M-learning

This category sought to inspect the attributes that encouraged respondents to use m-learning, and included three themes: Student Enjoyment, Pedagogical Awareness, and Personal Issues.

Student Enjoyment

In response to the first category (Attributes of M-learning Use), most of the teachers (89.4%) focused on the potential opportunities that m-learning offers for students both

inside and outside the classroom. Sample quotes regarding the possibility for students to enjoy m-learning included: “Students are really attached to their mobiles, so we can make use of that. It's more interesting and enjoyable” and “Students’ lives are all about their mobile phones nowadays. Why not make something good out of this obsession? It might be more appealing and interesting to students to explore new methods of learning. It helps them discover other uses of their devices that can help them learn and benefit”.

Pedagogical Awareness

There were numerous opinions (81%) supporting the use of m-learning from a pedagogical side, including that “using mobile devices for learning might help [in] increasing the motivation to learn and facilitating interaction, ease of monitoring, keeping students’ knowledge up-to-date with the digital age, increasing the availability of digital resources and reducing teaching loads more than traditional teaching, encouraging learning outside the classroom, and making material available on the go”. Other teachers’ views agreed that “The availability of digital capabilities can contribute to facilitate […] information and knowledge”, and “In [the] clinical setting, m-learning [may] help in finding evidence [for] the teaching content and [to] provide videos with stimulation [to] help the learning process”. One faculty member said that “the potential features in mobile devices, such as photos, audio and video allow students to understand and explore […] information easily”, whilst another stated: “The integration of the mobile in the teaching and learning process will facilitate the task for both teacher and students”. One brief comment noted that “m-learning is an alternative solution given to students to understand”. From a faculty perspective, views about utilising m-learning considered it very important to simulate teaching methods used in m-learning overseas.

Personally Identified Attributes

Although this theme only comprised a few personal comments (3%), it is important to cite these as other faculty members might share similar opinions or face similar issues. One teacher noted: “it is a necessity that I use a mobile device while teaching because

I suffer from a visual disease (RP) and so I must use it, [but] as well […] it has made teaching in general, and correcting writing material in particular, so much easier".

5.1.1.2 Barriers to Using M-learning

This category aimed to elicit the barriers to using of m-learning cited by respondents in their responses to the first open-ended question. This category included seven themes: Technical Issues, Training Needs, Mobile Devices as Distractions, Administrative Issues, Social Norms Issues, Student Skills Barriers, and Students Ownership Issues.

Technical Issues

This theme from the facilitating condition factor section of the questionnaire was expanded on by respondents' comments (92.5%) in the open-ended section, where the multiple technical problems that they had experienced and that prevented them from using mobile devices for learning and teaching were discussed. Technical problems were related to issues such as mobile device limitations and weak internet and Wi-Fi signals. In relation to mobile device limitations, participants articulated some concerns about using their own mobile devices, stating: "it might affect the efficiency and usability of my phone as it could require a large storage capability". They also mentioned shortcomings in device capabilities generally, including screen size, battery life, and the issue of device storage again.

In regard to the technical perspective, the respondents pointed to the lack of internet infrastructure and Wi-Fi availability as the main obstacles that prevented them from adopting m-learning on university campuses. Sample quotes supporting this included: "The coverage of the Wi-Fi inside the campuses is poor and there is a lack of proper infrastructure" and "the curriculum in some fields is difficult to implement [through] mobile learning techniques". Others regarded the applications on mobile technologies as lacking the functionality and consistency they have on desktop computers (and laptops). Examples include Flash reader, Java plugs, Word, PPT, etc. One respondent stated, "I cannot edit my files at all and viewing them on that tiny screen always

changes the format, especially if I have some tables, figures or any non-text materials. I believe that reading or studying on that relatively small screen would eventually harm my eyes and offend my visualisation study skills".

Training Needs

The respondents also emphasised the lack of trained teachers and courses for providing a full picture of the benefits of m-learning and how to implement this new technique in their professional practice. One teacher stated: "In my opinion, it is a matter of gaining the necessary knowledge of how exactly we can use mobile devices to our advantage when teaching in or out of class".

Mobile Devices as Distractions

There were a few concerns (23%) mentioned in the theme addressing pedagogical issues concerning distractions, such as that "it is easy to get distracted when you are trying to study in your entertaining environment (such as online chatting, BlackBerry Messenger, WhatsApp, Facebook, Twitter, or games)".

Administrative Issues

This theme concerned university administration problems. The respondents expressed their disappointment at the lack of administrative support that was provided to them. These aspects, and others recorded in this section, required follow-up in the interview phase.

Social Norms Issues

A number of views were given regarding social norms. Most respondents' comments concerned the privacy and conservative lifestyles of women in Saudi society. The most common quote was: "Privacy and [the] conservative values of some teachers and students may lead to the refusal of [the] use of mobile devices in classrooms". Some faculty members expressed their concerns about their students' using mobile devices in classrooms to video the lecturer. One said: "The most important reason to not

integrate m-learning is the misuse [of] mobiles by students in class", whilst another faculty member stated that "using such a technology within the Saudi context can lead to many car accidents :)". However there was no further explanation of these points, so further information needed to be solicited from the interviews.

Student skills barriers

Very few comments were given concerning student barriers to adopting m-learning. Only five teachers believed that students are unwilling to use m-learning, show variations in their skills and abilities in using smart phones or lack the knowledge to use m-learning. One participant commented that "the fair judgment in grading will be affected significantly between students due to the variation in skills and abilities in using smart phones". Another teacher stated: "This method does not give equal chances to the underprivileged students, with limited access to such resources. However, if implemented it is of great help to those who have the accessibility and means to use it".

Student Ownership barriers

Very few views were expressed about problems relating to student mobile ownership. One participant identified this issue in detail, however, stating: "The financial status of students varies, meaning some students cannot obtain a smart phone and/or pay for the use of cellular data".

5.1.1.3 Future Encouragement in Using M-learning

This second open-ended question aimed to assess the views of the faculty members about how they could be encouraged to use m-learning in the future. This category was divided into four themes, based on repeated views, comprising: Technical Issues, Training Needs, Administrative Issues, and Social Norms Issues.

Technical Issues

The highest number of responses in the "Barriers to Using M-learning" category related to the Technical Issues theme, and a parallel phenomenon was seen for this theme in the 'encouragement' category. A lack of technical support from the university and a lack of internet infrastructure concerned faculty members, who said that "the provision of those structures was necessary for encouraging the use of m-learning in a face-to-face mode". In addition, some of the responses here stated that "offering some ready-made resources that fit into the standard curriculum can help teachers to follow and design a new mobile technology in a way that allows an easy switch between current technologies (Blackboard, Acadox, etc.), and other new technologies". In addition, some teachers felt that they needed to gain the necessary knowledge on exactly how to use mobile devices successfully in teaching, agreeing that: "The University is required to offer a good internet connection as well as free applications that match our subjects and teach us how we can use them in our professional practices".

Administrative Issues

Some participants reported that there were problems relating to university administration that needed solving before there could be a strong base for successfully implementing m-learning. Quotes on this include: "I may think to use it if teachers are given more freedom", that there is a need for "crediting faculty's efforts when using mobile learning", and that faculty "might be encouraged by reducing the burden of teaching and [giving] rewards to [those] who use m-learning".

Social Norms Issues

In relation to this theme, participants offered some solutions to the barriers to m-learning that they viewed Saudi social norms as creating. For instance, one male teacher stated that mobile learning could be utilised "for giving women ease of access to teaching", whereas another stated that "the foundations for [the] use [of] m-learning must lie in accordance with the customs and traditions of Saudi society by adopting specific types of hardware and software for use in education". Other opinions mixed two themes – training needs for students and professors, and engaging with social

norms issues to illustrate the advantages and disadvantages of using this teaching method in Saudi universities. Another side view given by a number of participants emphasised the social norms of Saudi Arabia, stating: “Our Saudi society has its own rules! This has to be taken into account when trying new strategies. The actual student-teacher relationship is very important. Teachers are required to be role models in different aspects of personal and professional behaviour”.

Training Needs

Regarding the encouragement of the future use of m-learning, a high proportion of respondents believed they could accept m-learning if they had good, purposeful training that provided the necessary knowledge and resources, and were given guidelines or tutorials to help them use it in their teaching. Quotes relating to this theme include: “By being given appropriate training sessions by the university I might accept using m-learning”, and “We need workshops and faculty development programmes to learn how we can use this technology with our students”.

5.1.2 Conclusion

Detailed information from the open-ended items was added to data from the Likert-style questions to generate the results of this study. This part of the chapter has presented the qualitative data gathered from the two open-ended items used in the survey, which was analysed through manual coding. Several themes and categories emerged from the participants’ answers to the questions, and three categories were formed for the analysis of this section: (a) attributes of m-learning use, (b) barriers to using m-learning, and (c) future encouragement for using m-learning.

The first category was divided into three themes, based on the frequency of repeated ideas. This part determined that the faculty members surveyed were aware of the potential benefits provided by the enjoyment of using mobile devices for learning, and the pedagogical opportunities it provided as well. The category dealing with the barriers to the use of m-learning generated a high response rate from faculty members, who explained why they were not encouraged to utilise it in their professional practice.

Although the item in the survey concerning infrastructure was excluded from the data analysis due to its lower levels of reliability, most of the comments linked to technical issues and training needs concerned the lack of technical support and internet infrastructure within the university, including training sessions for both students and teachers. In relation to the issue of Saudi social norms, participants expressed their concerns about using m-learning given some of these norms. However, they expressed willingness to use m-learning in the future if these matters could be addressed. Finally, it was seen that further explanations for some vague responses would need to be more fully investigated in the interview phase. The following section will now describe the qualitative data collection methods that were used, outline the interview design, and discuss and analyse the data collected from the interviews.

5.2 Interview Data Analysis

This study was designed to allow the survey's results to be used to develop the interview questions in order to ensure that they gathered valid and reliable data that could further explain the survey findings and provide extra information to answer the research questions. The quantitative part of the research aimed to triangulate three dimensions – the survey's results, the content of the interview questions, and the in-depth information drawn from the interviews. Hence, the interview questions were designed in a scientifically rigorous way by using the faculty members' perceptions towards adopting mobile learning that were obtained from the questionnaire results. The interview questions, the pilot study, and the data results and analysis are provided later in this section.

5.2.1 Interview Questions

The main research question is concerned with exploring the impact of social norms on the adoption of m-learning and whether social norms are perceived differently by male and female faculty members. The results of the survey indicated the presence of statistically significant differences in social norms scores among the research samples, based on faculty members' intentions to use m-learning both now and in the future. However, the results also suggested that there were no significant differences in how

social norms are perceived to impact on the use of m-learning by male and female faculty members. Two questions were designed to discover the reasons for these findings – particularly on the issue of why there were no differences found between male and female faculty members' perceptions about social norms. The results from these interview questions will help us to understand the survey findings in this area. The questions are as follows:

- The survey results suggest that respondents who are more influenced by social norms are less likely to adopt mobile learning, both now and in the future. Why do social norms significantly impact on faculty members' intentions to use mobile learning?

- The survey results suggest that there is no significant difference between genders in relation to the acceptance of m-learning. However, both males and females have the same concerns regarding how Saudi social norms might impact on adopting mobile learning. How do you interpret this?

The survey results also indicated that there were statistically significant differences at the $p < .05$ level in all constructs relating to behavioural intentions to use mobile learning (performance expectancy, effort expectancy, social influence, facilitating conditions, perceived trialability, perceived Saudi social norms, and resistance to change). After the combined effects of all the factors had been tested, the results indicated that facilitating conditions, perceived trialability and perceived social norms were the most significant predictors of participants' willingness to adopt mobile learning, both now and in the future. The follow-up interviews needed to seek further explanations of these results. Five questions were designed to do this, as follows:

- The research results indicate that the resources and knowledge necessary to use mobile learning, the presence of a team of specialists to assist in its use, and university administrative encouragement in using mobile learning were significant predictors of participants' willingness to adopt mobile learning,

both now and in the future. What are the circumstances surrounding m-learning in your work environment, and what is (are) the problem(s) and solution(s)?

- Trialability is an important factor impacting on user adoption of technology in general, and this study found that the teachers who are unable to use (or struggle to use) mobile devices in teaching and learning (for example, to upload or download lectures, assignments, quizzes, and feedback) and/or that perceived their students to be unable to use (or to be struggling to use) mobile devices and tools in their learning (for example, by listening to lectures, downloading and uploading materials, chatting online etc.) were less likely to have adopted mobile learning. What is your opinion on this? How can we make mobile learning trialable for teachers and students?

- The survey results suggest that some teachers are influenced by the conservativeness of Saudi universities (and their staff and students) in using mobile devices equipped with a camera, whereas others were not influenced by this. Can you explain why you think that this is so?

- "The misuse of mobile devices by students could prevent teachers from using mobile learning in classrooms". In your opinion is this the case? And, if so, what sort of behaviours are you concerned about?

- Do males and females perceive the use of mobile learning on university campuses to affect the privacy of women in Saudi society differently? How? Why?

Finally, as the findings of the survey indicated that the more skilled teachers are at using different features of mobile devices, the more likely they are to adopt mobile learning in both their current and future practice (and vice versa), the following interview question was asked:

- The results of the questionnaire indicated that there are significant differences in the level of skills that faculty members have in relation to using mobile devices for teaching and learning (i.e. the less skilled that teachers are in using mobile devices, the less likely they are to adopt m-learning in their teaching practices). Can you provide reasons to explain this finding?

The answer to this question will help us to understand the different degrees of skills that teachers have in using mobile devices for learning and teaching purposes, which could lead to very strong indications regarding how the university administration could enhance faculty members' abilities to use mobile learning. However, before proceeding to ask these questions, they needed to be piloted and tested for validation purposes.

5.2.2 The Pilot Study of the E-Interview

On the day of interview, the interviewer and the three interviewees attended the online meeting while they were at home in order to avoid noise and disruption, while only one interviewee undertook the interview at work, who was, at the beginning of the meeting, interrupted by colleagues. However, respondents can, of course, be distracted if they are situated in either their home or work environments. The first five minutes of the interviews were allocated for welcoming the interviewee, asking whether they needed any help, and offering to solve any problems that may occur. In two interviews, I waited from five to ten minutes for a respondent to enter the Adobe Connect environment to commence the interview. However, it should be noted that distractions and lateness could equally arise in face-to-face interviews. The semi-structured e-interviews were planned and prepared to make certain that the instrument did what it aimed to do, and to allow me to answer the research questions and resolve the specific problems that may arise.

In general, the e-interviews were piloted smoothly and successfully. As stated earlier, the interview questions were prepared based on the survey results, and seem to be well designed for conducting the real interviews. However, the semi-structured interview allowed me to raise any questions based on the discussion and the opportunity to reflect on whether they addressed the research's direction. Each interview was

designed to take approximately one hour, but some of the participants were willing to carry on past this and provide more information about their attitudes towards adopting m-learning, extending some of the interviews to an hour and a half in length.

The possibility of technical problems was one of the concerns that I had before conducting the pilot study, but no such problems occurred here. Detailed information about how to use the software and the technical problems that may occur while using Adobe Connect had been sent to each participant in advance with the aim of avoiding (or minimising) any interruptions during the interviews. Although the method for collecting interview data was not clearly stated in the survey when the participants were asked if they would be willing to be interviewed, all the e-interviewees expressed their comfort and ease in using the software, and commented that the software did not need prior experience to use. Offering five minutes before the start of the interview helped for solving any problems and made the participants more confident with the online environment. Furthermore, the audio recordings were tested after each interview to make sure that the recoding worked correctly and was free of any technical problems. Text, audio and video were tested and used. However, the video feature was not acceptable for the female participants for cultural reasons.

5.2.2.1 Validity and Reliability

In qualitative research, an explanation of how the validity and reliability of the collected data can be assured is needed. Sandelowski (1986, p 29) stated that "a research instrument is valid when there is confidence that it measures what it was intended to measure". In piloting the interviews, ensuring the validity and reliability of the collected data was a high priority. Thus, the data were authenticated by providing respondents with the opportunity to review and comment on the content to check that the findings reflected their own experiences and perceptions regarding the adoption and use of m-learning. The four pilot interviews were also used to develop my interviewing skills and confidence prior to the main study in an attempt to increase interviewer reliability.

Despite the many positive aspects of the interviews, there is a lack of objectivity and generalisability inherent in the qualitative paradigm. Generalisability is the degree to which the findings can be applied from the study sample to the entire population (Polit & Hungler, 1991, p.645). Because the interviewer gathers words from interviewees, and then analyses them, focusing on the meaning of the data, is the interpretations of this raw data differ between individual scholars. It may thus be contended that qualitative results are not generalisable because they are subject to human differences and errors in interpretation. Bridging this concern is possible in this research, since my position from the earliest design stage is as an outsider, which makes the potential for bias relatively low.

The online interviewing method is still in its infancy, yet it has already produced benefits in this research and in other pieces of research, although a lack of literature on online interviewing using Adobe Connect as a communication medium limits the use of this technique in social research. The following section will now explain the discuss the interview process for this research in more depth, showing how the interviews were prepared, the reliability and validity of the use of interviews in this context, and the data analysis methods.

5.3 The Main Interview Process

Thirty-four faculty members provided their email addresses, and all these members were contacted to thank them for participating in the survey and for expressing their willingness to contribute to the interview phase, and also asking them to provide a time and date when it would be convenient for them to be interviewed. This research aimed to interview between 20 and 30 faculty members (10–15 male and 10–15 female) on a first-come, first-served basis. In the survey phase, respondents were asked to provide their email addresses if they would be willing to participate in an interview, and hence interviewees were chosen from those that gave this information, thus acknowledging their willingness to participate further in the research. Furthermore, similar to the pilot study, an interview information sheet was sent to all the targeted participants so that they could read it carefully before participating in the interview. It is worth noting that four of them joined in the pilot study. Moreover, these participants

were asked to sign a consent form that clarified the research objectives and the procedures for ensuring that the anonymity of participants was preserved prior to the online interview being conducted (see Appendix 3 for the sample email, the information sheet, and the consent forms).

Twenty faculty members responded to the initial contact, and provided a time for an interview together with signed consent form (or oral consent prior to starting the interviews). All the interviews were conducted in a synchronous online mode *via* Adobe Connect software except for one, in which a male faculty member asked me to send him the interview questions via email, and subsequently emailed back written answers to the questions. After this, the participants were then sent a link for the online meeting, based on the time and date they had provided. The interviews began with a brief explanation of the interview process and a request that the participants who had not signed the consent form give their consent orally, and were asked for permission to record the interviews for the sake of accuracy. The average interview length was 68 minutes, and recordings were made automatically through the use of the recording feature in the Adobe Connect software. Audio links were automatically generated at the end of each online meeting, and the researcher transcribed each interview using Microsoft Word.

5.3.1 The Reliability and Validity of the Interview Data

Interview transcripts were made immediately after the completion of each interview and checked for errors in order to ensure their reliability (Creswell, 2009). A copy of each interview transcript was sent to the relevant participant to ensure that it exactly captured her/his perceptions. A random sample of interview recordings was selected and listened to by a trusted person to ensure the accuracy of the transcription process. Then, as the interviews were conducted in Arabic, all the interview texts were translated from Arabic to English, and an expert English/Arabic translator was used to check the accuracy of the translations in order to ensure their validity. In addition, the interpretations of the data were doubled-checked by this expert to ensure that the translation text was accurate.

Thematic coding was used to determine the context and relationships of categories and themes. Furthermore, some of the categories that were produced were based on the survey constructs, and others were created in relation to the interview data. Thus, a hybrid qualitative data analysis was deployed, composed of both theory-driven code and data-driven code. The categories were also given definitions, and data were harmonised with each code to guarantee matches in meaning. The data analysis process resulted in the construction of major categories, which were then segmented into several themes to accurately represent related interview responses. During the coding process, all audio recordings were listened to twice, and transcripts were checked to confirm their accuracy and reliability. In order to guarantee validity, the survey results and research questions were triangulated with interview data to build a rationalisation for evolving themes.

To assure the credibility of this study, two external researchers were asked to participate in the data analysis process. They were invited to analyse some samples of interview transcripts without relying on any predetermined themes. After this, their analyses of these invented themes were compared with my data analysis results to control for any researcher misinterpretation or bias in the data analysis. As a result, any supplementary themes that were not included in my results were added at this stage.

5.3.2 Analysis of the Interview Data

The analysis of interview data is a process that involves ordering and organising data, and aims to present data in the form of information that can be used to answer research questions. Within this research, the interviews and their analysis were mainly used to support the quantitative findings, and to dig deeper into faculty members' viewpoints on the adoption of m-learning within their professional performance. A sample of twenty faculty interviews were conducted with ten male and ten female academics from a variety of different fields (Applied Sciences, Medicine, Food Nutrition, English Language, Arts and Humanities, Education, Computing and Information Technology, Communication and Media). In addition, the demographic data for the interview sample was collected using the data they entered in the survey records. In relation to

the survey results, age, gender, academic position, and teaching experience held no relationship with the gathered data, with only age groups and academic positions being considered for the purpose of having a representative sample and exploring differences in perceptions (see Table 5.2).

	Frequencies		**Academic Qualification**		
Age Groups	**Male**	**Female**	Bachelors Degree	Masters Degree	Doctoral Degree
Under 30	2	2	6	8	6
30-39	3	3			
40-49	3	3			
50-59	2	2			
Total	10	10	20		

Table 5.2: Demographic Data of the Interviewees

Although the data presented in the following section was produced using a systematic linear technique, its collection and analysis were conducted in parallel. This means that the interview transcripts were read and re-read, and the extraction of themes was performed iteratively and reflexively to ensure the authenticity of the data (Feredey and Cochrane, 2006). A mind map was developed for each kind of thematic data analysis to determine the possible themes based on the interview transcripts, and then related themes were assembled and grouped into several categories to facilitate the coding process. The two types of thematic analysis – deductive and inductive – are detailed in the following sections respectively.

5.3.2.1 The Deductive Theory-Driven Code Approach

Hypothesis-driven study is guided by hypotheses that can be assessed through the analysis process (Guest et al., 2012). Through linking theory-driven code to the conceptual framework that was developed for this study (see §1.4), an analysis of the relationships found within the interview data was organised into fifteen themes. Those themes were coded in advance based on the items that were shaped from the survey's items. Themes were then assembled into seven categories that emerged through an analysis of the interview data and the survey findings, most of which are connected to the constructs of the research's conceptual framework and research questions and based on the Unified Theory of Acceptance and Use of Technology (UTAUT; Venkatesh et al., 2003); one of which is a construct of the Diffusion of Innovation Theory (DIT; Rogers, 2003); and two of which are constructs of the extended constructs.

Figure 5.1 shows a mind mapping of the theory-driven codes that emerged through data analysis. This process was conducted in numerous stages. First, the codes were constructed in the early stage of the data analysis procedure by using NVivo. The research's conceptual framework and the research questions provided the lens through which to develop the template for the theoretical themes. Second, during the analysis, the coding consistently linked the frequent themes to the constructs of the UTAUT and DIT theories and the extended factors.

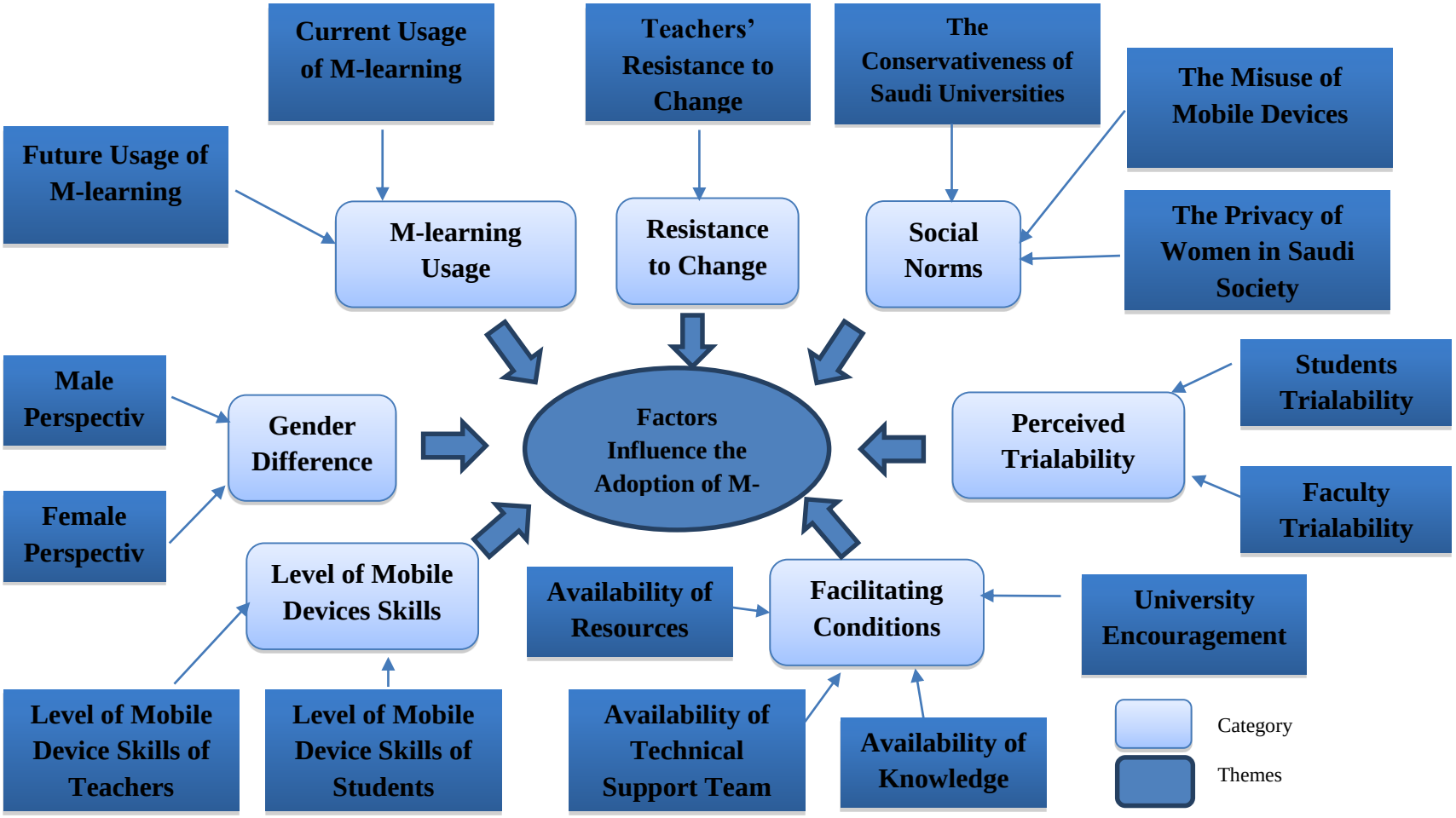

Figure 5.1: Codes developed a priori from the template of codes (deductive theory-driven code approach)

The transcript data was then read and summarised to count and label similar data. After this, the coded data was allocated to each codebook section. Finally, the template for the theoretical themes was assembled to outline the seven categories. These categories comprise: M-learning Use Expectations, Social Norms, Gender Differences, Facilitating Conditions, Perceived Trialability, Resistance to Change, and Level of Skills in Using Mobile Devices. Based on the mind-mapping diagram in figure 5.1, themes were associated with descriptions in order to provide a clear meaning to each code. The themes, their definitions and some examples quotes are presented in Table 5.3.

No	Theory-driven code	Description	Quotes from Interviews' Transcripts
1	**Current Use of M-learning**	This theme aims to record current teachers' experiences of using m-learning.	I do not have too much information regarding either apps that are developed for learning or other ways to implement m-learning, particularly in my subject. I used 'WhatsApp' to record some videos and photos for my students. I made a group of WhatsApp and asked any willing students to volunteer to join the group. I browse my students' homework and tasks through my mobile device or laptop.

2	**Future Use of M-learning**	This theme aims to record the views teachers have towards using m-learning in the future in terms of what they see as the incentives and disincentives of its use.	I expect [an] increasing usage [of] m-learning in [the] future. I imagine m-learning will be a promising pedagogy.
3	**The Conservativeness of Saudi Universities**	This theme aims to explore the reasons why beliefs about the conservative nature of Saudi universities significantly influenced faculty members' perceptions about using m-learning.	In general, there is a conservative attitude regarding photographing or videoing in the whole society. Unfortunately, our society photographs everything, and publishes it without getting a copyright.
4	**The Misuse of Mobile Devices**	This theme seeks to recognise why the misuse of mobile devices could discourage or prevent teachers from using m-learning inside classrooms.	It's definitely irritating when you feel like students aren't paying attention to the lecture. It is difficult to trust that students are actually doing work and not straying off task – they may get distracted by mobile apps through the lesson. I do not want my students to have my phone number – they may call or text any time.

			A simple misuse example is imaging me in [an] improper position, especially when videoing me while commencing a systematic violation.
5	**The Privacy of Women in Saudi Society**	This theme aims to explore the reasons why the importance of respecting the privacy of women significantly influenced faculty members' perceptions about using m-learning.	It is assumed that the privacy of women is [a] big and worried [sic] issue not only in Saudi society, but also [that] it is [a] controversial issue in Arab societies [in general]. The issue of women's privacy has been given a huge context in [the] media, greater than the original dimension. In addition, it is a partial marginal issue that has been exaggerated. Saudi social norms consider the image of women as a red line which cannot be bypassed, and it is not [seen] much as a religious [norm] as it is taking into account the observance of the community, whether [it is a] big or small community.
6	**Male and female Perspectives of**	These two themes aim to understand how	Education and receiving … information – [for] both

	Gender Differences in Accepting M-learning	males and females react either similarly or differently to the influence of social norms in relation to the use of m-learning.	males and females – come from approximately one source, and the environment where both live in is homogeneous. However, nowadays, the urban environment is a greater openness – especially [for] the urban women. The openness of our culture to different cultures influences … [a] woman based on her background – there are some of them who [are] positively influenced by different cultures, whereas others women [have] left the restrictive shackles [on] them. There is … weak confidence in women to take bold decisions, and often [they] cannot do it. I do not think that the acceptance of m-learning is affected by gender. Always within the university, important decisions are issued by [the] men's section – women are always taking the decisions, and obey … them.

7	**Availability of Knowledge**	The existence and availability of knowledge which could help teachers to understand the use and benefits of m-learning.	I do not have too much information regarding either apps that are developed for learning or other ways to implement m-learning, particularly in my subject. If there were training courses that taught me how to use m-learning, I am ready from the next semester to deploy it with my students.
8	**Availability of Resources**	This theme refers to the existence and availability of mobile learning resources which could help teachers to use mobile devices and their capabilities in their teaching.	I need to realise and be aware of the most important resources and applications used in my specialty. I need to be provided [with] the core keys to employing mobile devices in teaching and learning. With regard to mobile learning technology, I do not have too much information regarding either apps that are developed for learning or other ways to implement m-learning, particularly, in my subject. We miss the digital content that serves our subjects and we miss specialists who are

			able to help … educators in transferring knowledge and textbooks into digital content. Are there any Arabic mobile applications? Some students do not have a computer or smartphone. The cost to own mobile devices is not often available to all students and that makes inequity between students.
9	**Availability of Technical Support Teams**	This theme refers to the existence of technical support teams which could help teachers to solve any problems they may face during practising the mobile learning process in classrooms.	The existence of a dedicated team in the university is also the most important pillar of the success of m-learning. That means there will be specialists who are ready to solve any problem 24 hours throughout the university term. The existence of [a] technical support team helps [to] shorten my time.
10	**Existence of University Encouragement**	This theme refers to the availability of university encouragement for m-learning, which could	It seems that university's encouragement is very weak and limited … regarding the use of m-learning. I imagine that if the university is encouraging teachers to use

		inspire teachers to adopt it.	m-learning similar to it's encouraging to use 'Anjez', most of the teachers [would] deploy m-learning in their teaching practices.
11	**Faculty and Student Trialability**	This theme aims to explore the importance of the relationship between trialability of m-learning for teachers and their adoption of it.	The teachers' ability to try mobile learning is very important to be ready for its implementation. If the teachers were able to practise m-learning, they could adopt it in their teaching.
12	**Teachers' Resistance to Change**	This theme aims to understand the reasons that some teachers have in resisting change from traditional teaching methods to the integration of m-learning within higher education.	Our social norms influence every aspect of our life "teaching in schools, colleges, universities, and at home", students and teachers getting used to one way of teaching which is "paper and pin". With respect to all teachers, the old faculty members are more likely to resist to change their classical teaching method.
13	**Level of Mobile Device Skills of Teachers**	This theme focuses on recording teachers' perspectives about their own skills in using mobile devices, as well	I think the skills … vary depending on [the] specialty of each teacher.

		as enquiring about why mobile usage skills are important in m-learning scenarios.	Everyone who owns a skill is looking up and motivated to use and employ technology in education. If the technical skill is low, that will prevent achievement, and make the teachers return to traditional methods of teaching.
14	**Level of Mobile Device Skills of Students**	This theme aims to record teachers' perspectives regarding their students' skills in using mobile devices.	My students already download their lectures on their mobile devices. Some students do not have email or do not have a computer or smartphone.

Table 5.3: Codes developed a priori from the template of codes (Deductive Approach)

The above table shows the codes that were generated from deductive thematic analysis. Each row has its own description, and sample quotes were imported from the interview data. The numbered data rows from the above table are explained and detailed in the following paragraphs.

1. Current Use of M-learning

The current use of m-learning theme aimed to record teachers' experiences (if any) of using m-learning in terms of what they see as the incentives and disincentives for its use. Interviewees who had not used m-learning were asked to provide an example of its use in higher education in order to help them better understand it, whilst faculty members who had already used m-learning were asked to record their experiences of using it. Approximately half of the interviewees (n=10) reported that they did not

currently use mobile learning, and that they were not aware of what was available for educational use on mobile devices, either in terms of apps that are developed for learning or other ways to implement m-learning across several subjects. Some faculty members thought that if they understood what mobile devices could be used for in teaching and learning, it could help them to understand how to implement their use within their professional practices, and to thus increase their teaching capabilities – something they viewed as being of benefit to them. Although half of the participants did not use or acknowledge the term or concept of m-learning, they offered their understanding of this new idea. Some of the definitions and examples of m-learning provided by faculty were as follows:

> "M-learning is the learning that allow the use of mobile devices and their applications for the educational purposes. For example, there is applications which can be created on the mobile devices and then be used in learning, I know an application such as 'laboratory result interpretation' which was found in Apps store, and I can't remember another example."

> "It is difficult to know something that I have not seen it up close from academic side but I will strive myself to define it: "Mobile learning is the learning that connects [the] teacher with his students through applications in smart phones in order to shorten the time in some academic and educational tasks."

However, three of the faculty members believed that mobile devices should only be used for social functions, holding that they are not appropriate for educational practices.

On the other hand, half of the teachers used mobile devices for learning and teaching purposes through WhatsApp or similar social networking apps (e.g. Twitter, Facebook) for simple, extra platforms for communication. However, they did not consider this way of teaching to be representative of the m-learning teaching method. Some faculty members described the use of WhatsApp as a simple way for implementing m-learning by recording videos and photos and posting them on the app, then asking their students to comment and reflect on these posts, or for holding group discussions with their students. Another simple example of the use of m-learning by teachers was their use of electronic mail. Although only two of them noted that they

used emails to follow students' homework and progress through smart phones or laptops, the rest used emails as an announcement space.

One faculty member from Applied Science detailed his experience as follows:

> "I made a group of WhatsApp and asked any willing students voluntary to join the group. This activity was mainly to support self-directed learning. I asked students to search for images that related to our subject, posted on the group, and wrote [a] description and reflection on that photo. I had half of my students who signed up and enjoyed this experience and the others did not for their personal reasons."

Although the lecturers set up the activities mainly to support self-directed learning, they stated that not all the students had responded to the activities that involved using mobile devices. Moreover, the faculty highlighted that the purpose of discussion groups using WhatsApp were to provide a good way to communicate with students and to move from 'one-sided' to 'two-sided' communication. Although some faculty members already used e-learning, they noticed that there were some students who did not have email, or did not have a computer or smart phone.

2. The Future Use of M-learning

The future use of m-learning theme aimed to record teachers' views towards using m-learning in the future in terms of what they saw as the incentives and disincentives of its use. It expected to capture the academic teaching staff's thoughts regarding how m-learning could be used successfully in Saudi higher education in the future. All faculty members (n=20) revealed their willingness to use m-learning in the future, and they labelled positive and negative factors that may have an impact on the implementation of mobile learning within Saudi higher education in addition to the factors that were proposed by this research. Several different opinions were provided on the future use of m-learning, but they were all optimistic views, expecting an increasing use of it in the future. One sample quote was:

> "I imagine m-learning will be a promising pedagogy."

However, the participants' positive opinions regarding the potential for utilising m-learning in the future were conditional on certain states of affairs being realised. The data gathered in the interviews gives further support to the idea that there is a lack of educational, technological, social and cultural awareness regarding m-learning in Saudi universities.

A good evaluation of how m-learning could be developed in the future was provided by one interviewee, who outlined the way in which he believed Saudi universities should design and manage this process. He expressed the belief that there has been a degree of randomness and confusion in its early use, but suggested that if the university community plays a greater role in disseminating m-learning, tries to organise its deployment, and draws faculty members' attentions to the importance of its use, then there should be a promising future for this bright and modern way of education. He stated:

> "I expect increasing usage [of] m-learning in future. In the beginning, there may be some kind of random[ness] and confusion in its use, but if the university community plays a greater role [in] disseminating m-learning influences and tries to organise its deploying and [attract] the faculty members' attentions to its importance usage, there will be a promising future for this bright and modern way of education. We are now in a rush stage, then it seems that we will be in the random phase, and then we will move to the stage of technical and increased awareness of m-learning usage. Then there will be an investment phase in which it will be positive results. I am optimistic."

In addition, some teachers suggested that several factors need to be considered before m-learning can be successfully implemented in Saudi higher education. One common obstacle that was pointed to was the financial implications of using it for both teachers and students. A number of faculty members observed that the cost of mobile devices is prohibitive for some students, and that using m-learning could thus lead to inequities between students. One sample citation was as follows:

> "I wished that you might look at economic factors and standard of living for both students and teachers. Does the acquisition of [a] mobile device with [a]

value of $500 influence [the] adopting [of] m-learning in higher education settings?"

Also, some teachers have old cellular phones and find it difficult to change to smartphones because they are not familiar with or interested in the new technology. Another perceived barrier to implementing m-learning was the lack of Arabic apps for Saudi lecturers who are not fluent in English.

Both teachers' current experiences of using m-learning and their views about using it in the future were grouped and assigned to the m-learning use expectations category.

3. The Conservativeness of Saudi Universities

One of the social norms considered in the survey was the conservativeness of Saudi universities, which was reported as significantly influencing the participants' views about adopting m-learning. This interview data thus provided deeper understanding about why the conservative nature of Saudi universities significantly affects the adoption of m-learning. Most faculty members expressed a conservative attitude towards their students' use of mobile cameras, stating that they considered the camera feature on mobile devices to be a potentially dangerous aspect of their use for m-learning in the classroom. Several examples of faculty views are presented in Table 5.3. Numerous faculty members expressed the view that there is a lack of awareness within Saudi society about issues such as photographing, publishing, and copyrighting images and videos, providing some evidence to support this, and offering solutions for limiting and preventing the publishing of photos and videos.

On the other hand, the data collected from this question revealed that several aspects of Saudi social norms significantly affect faculty members views about adopting m-learning. Some faculty members held the view that the negative comments provided by frustrated faculty members make some other faculty more reluctant to use mobile learning. One faculty member explained a general way in which social norms influence the life of Saudi people:

> "Sometimes social custom and norms control the psychology of professors more than religious custom because the controller of social custom is imperceptible and not metaphysical 'or invisible' like religion custom. For

example, Saudi Social norms considers the image of women as a red line which cannot be bypassed, and it is not as much religious as it is taking into account the observance of the community – whether big or small community (i.e. family – district- or town). Wait, this case is not limited merely to the women, it also includes men. For example, some people consider the emergence of man's image as definitely a kind of 'showing off' of himself to females, hence, sometimes we, as 'male professors', move away from the use of [the] picture during the lesson to not be distributed later in the media. Sometimes, the comments from colleagues to the faculty who allow taking photos in his lessons are degrading."

The predominant view amongst the informants was that social norms still present a barrier to some permissible behaviours, such as students videoing when teachers make errors, or slippage or exposure. One faculty member stated:

> "The faculty is prone to error or slippage or exposure to the embarrassing situation by students, so he could be afraid from the reaction of community to taunt him; and you know that we are live in a community that mocks the person who gets things wrong even if he is creative. A similar situation could be applied to students."

Others had reservations about taking pictures inside classrooms on the basis that teachers and students should respect university laws, such as the ban on using mobile devices inside classrooms because they may irritate other students. It is also possible that some teachers had (or were concerned about having) weaknesses in their academic performance, and where afraid that their flaws would be exposed and spread through recordings.

On the other hand, three male and two female teachers aged 39 or under were open to the use of cameras inside classrooms. These male teachers showed their lack of fear regarding the presence of cameras on mobile devices when considering their use of m-learning on campus. They also held that the practice of videoing the teacher could provide a useful way of advertising good and bad teachers. The female teachers, on the other hand, did show fears about the misuse of camera in classrooms, but accepted

that cameras could be used if students received permission, and when there was a reasonable purpose for using mobile devices in the class.

In addition, some of the respondents compared the initiative of m-learning with the first use of satellites in Saudi society, which were initially opposed, but are now widely accepted. On the other hand, two faculty members perceived m-learning as a new and suitable era of developed education, and did not consider it to clash with Saudi social norms. They both offered a comparison between peoples' reactions to the appearance of satellites and to the appearance of mobile cameras in Saudi Arabia. One of these contributors put it as follows:

> "Nowadays, Saudi social norms have begun to take a positive trend to promote education and to encourage the use and applications of technology in education and to contribute in increasing educational performance. I do not see any conflict between our social norms and the application of mobile learning – on the contrary, I see they are stimulating as long as values, social norms, ethics, and m-learning are compatible. Fifteen years ago, there were the first appearance of mobile device cameras (about 20 years since the first appearance of satellite) and I remembered that there was resistance and negative reaction regarding that. Then, with the aging of days, people understood that a lack of understanding of this technology was the key factor that [was] frustrating them to use it and, in consequence, the existence of mobile device cameras (and satellites) have become important and necessary to each individual's life. People have begun to understand that mobile devices are good and necessary tools. I think social norms are in the interest of the student and teacher, and I do not see any hindrance to deploy mobile devices in education."

4. The Misuse of Mobile Devices

This theme expanded the depth of the survey's findings and provided information on the types of misuse that faculty members believed students might commit in educational environments. It also aimed to recognise why the misuse of mobile devices could discourage or prevent teachers from using m-learning inside classrooms. Interviewees offered several insights, and samples of these are presented in table 5.3.

Although interviewees were able to suggest ways in which the use of mobile devices could be implemented, they seemed to be anxious about the distractions that devices could cause in the classroom, particularly in relation to the issue of students not paying attention to the lecture. One respondent commented:

> "Although students [are] always enthusiastic and interacting when using mobile devices more than the use of pen and paper, sometimes the use of mobile devices inside classrooms is dispersant, such as the student browses sports news or other unrelated topics to the class."

In addition, some teachers believed that their students could easily distract others by using their phones while interesting dialogue was occurring between the teacher and the students, and this prevented them from wanting to use mobile devices inside classrooms. On the other hand, some teachers expressed their disaffection regarding the use of mobile devices in their teaching because of worries about the misuse of their phone number by students, who they worried may call or text them during their personal time. These faculty members thus feared that m-learning could lead to unwanted communications between them and their students via mobile devices for non-learning purposes, such as for attendance and absence issues, grading and sending announcements:

> "I do not want my students to have my phone number, they may call or text any time, I do not prefer using mobile devices at all."

In addition to seeing distractions as a potential deterrent, the faculty also seemed to be concerned with other challenges that they perceived to be involved in implementing mobile learning in the classroom. Some faculty members were anxious about students misusing mobile devices by taking unwanted photographs or videos of them or their lessons and distributing them to social media websites, involving things such as students shouting, talking with their mobile phones in class, or mocking the lesson. There are other potential types of misuse, such as students filming teachers and modifying their images on Photoshop, or disseminating unreal images that harm the teacher. One faculty member put it as follows:

> "A simple misuse example is imaging me in [an] improper position, especially … videoing me while commencing a systematic violation, and that happens a lot. I mean, I do not like, for example, people to see me without 'Shemagh[5]', and I may sometimes leave it off. So, the student exploits this opportunity to distribute my picture. In addition, I might [have] violent students or have a mobile-talking during the lesson."

Finally, one faculty member talked about student misuses of mobile devices relating to cultural factors, noting that if students misuse mobile devices at social gatherings and outside the campus, they will inevitably misuse them on campus as well.

5. The Privacy of Women in Saudi Society

The survey findings revealed issues concerning how mobile devices are considered to be a great concern for the female university community, with both genders having similar insights on this issue. However, the details revealed through the interviews provide a greater depth of knowledge regarding the findings of the survey, and help to uncover the nature of this phenomenon in Saudi society. Several opinions were given on this issue.

On the one hand, most faculty members (n= 18) seemed to be very worried about the privacy of women, and generalised this as a problem that all Arab countries face. They explained how this issue impacts not only on education, but also on several arenas relating to women's roles and lives within the public sphere in these countries. In addition, informants repeatedly commented that there are several social factors within the Saudi community that control them and lead to different views regarding the privacy of women. For example, one respondent commented:

> "It is assumed that the privacy of women is [a] big and worrying issue, not only in Saudi society, but also it is controversial issues in Arab societies. However, this issue has many restrictions in [the] Saudi community – 'Saudis are more noise about this matter' – due to the wide … mix of several social

[5] Shemagh and Thobe is a formal dress for every Saudi citizen, and they must be wore during formal work time within government institutions.

> factors that control them. But how [does] that impact [on] the use of mobile devices in learning contexts? The privacy of women is not a case only in educational contexts, but it applies to all areas of our life. For example, in every Saudi wedding party, there are female inspectors in [the] female section[6] [that] search for mobile phones that [are] equipped with a camera and they are taken and kept away. Having this simple example in our life surely impacts on and limits the adoption of this technology in teaching and learning."

Only two faculty members expressed the view that the issue of the privacy of women is an 'exaggerated topic' that receives too much attention. They agreed that the issue of women's privacy has received a huge focus in the media – greater than the importance it had before media attention focused on it. In general, they thought that it was a cultural issue that has been brought into Saudi cultural practise more over recent years, and that was not originally given the attention it now receives.

6. Male and Female Perspectives on Gender Differences in Accepting M-learning

The survey's findings showed no significant gender differences regarding views on the impact of social norms towards adopting m-learning. Hence, the interviews sought to further discover how the findings of this study conflicted with those of other studies in this area. This theme helped us to understand how males and females react to the influence of social norms in relation to the use of m-learning. A common view concerned how both males and females live in one place, in one culture, and are controlled by the same social norms. Both male and female teachers emphasised that education and information for both males and females comes from the same source, and the environment where both live is homogeneous. One member of faculty stated:

> "The education and receiving of information for both males and females come from … one source and the environment where both live … is homogeneous. However, nowadays, the urban environment [has] a greater openness, specially [for] the urban women. The openness of our culture to different cultures

[6] The male section is segregated from the female section.

> influences the woman based on her background – there are some of them who [are] positively influenced by different cultures, whereas others women left the shackles that restricted them and those restrictions do not allow the development of education."

On the other hand, most male and female faculty members suggested that the similarity between both genders' opinions was due to university regulations, stating that commands are always issued by the men's section and so women have little power here. That is, women have to just follow these commands, and have no decision-making power in relation to such issues due to the perceived weakness of women in making 'bold decisions'. Female participants stated that they were afraid to lose their jobs if they stated their opinions frankly, and always try to keep pace with the general resolutions in the university and refrain from expressing views that may affect their careers.

The basis of these attitudes may largely be traced to old Saudi stereotypes, which have, to some extent, influenced both male and female perceptions alike. Half of the participants expressed the view that over the past twenty-five years, women in Saudi society have been reduced to a stereotype in which they are seen as 'a house of glass' and that, if any technology were to enter this house, it would shatter it. This has led to the belief that it is best to ban women from using such technology under the pretext of the 'privacy of women'. This has contributed to women's technological illiteracy over the years, and this illiteracy has, in turn, had a negative affect on the presence of and opportunities for women within the community. Accordingly, when men express their opinions about the privacy of woman, it is simply prudent for them to say 'no' to any technology and attribute this to a defence of women's 'privacy'.

A final category of view offered by two male faculty members was simply that the acceptance and use of m-learning is not influenced by gender at all:

> "I do not think that the acceptance of m-learning is affected by gender, age, [or] years of teaching".

7. Availability of Knowledge

Most of the faculty members (n=17) that were interviewed believed that they did not have enough knowledge to implement mobile learning within their professional practices, either inside or outside the classroom. The availability of knowledge focused mostly on the existence of training courses which could help teachers to be trained in using m-learning. The informants supposed that this might be due to the fact that they are not offered any training to provide them with knowledge about m-learning's potential uses or to develop the knowledge they have. However, they expressed their willingness to adopt m-learning in the future if they were given the necessary information concerning how it could be integrated into their teaching. One teacher commented:

> "If there were training courses that teach me how to use m-learning, I am ready from the next semester to deploy it with my students. I have this motivation due to I am a teacher who hates traditional routine in teaching and I aim to develop my teaching method. In addition, that because my students already download their lectures on their mobile devices, so I assumed that it will be great to have mobile learning environment contains our curriculum, homework, and times of the tests so that the student practise m-learning. Why not? ".

The faculty members need to be made aware of m-learning through training courses offered by the university that clarify its importance, the most important applications used in each specialty, its impact on teachers' academic and educational levels, and how it is potentially possible to raise the performance of both professors and students.

In addition, a number of participants made comments regarding their students' readiness to study using their mobile devices, and how they wanted to have mobile learning environments that contained their curriculums, homework, and the times of the tests. Only three participants reported having knowledge in using m-learning, whilst also holding that their students (or parents) were not willing to use and blend m-learning with traditional learning.

8. Availability of Resources

The faculty members were generally not very confident that the resources that were currently available to them were sufficient to support them in using m-learning, but said that if such resources were to be made available, this might help to facilitate their use of it in the future. All of the interviewees were unaware of what would be available for didactic use if they fully exploited the capabilities of mobile devices, which, in turn, negatively impacted on their current willingness to adopt m-learning. One sample quotation recorded from a faculty member stated:

> "Removal of physical barriers reveals the truth of the psychological attitude to the technology, and the existence of barriers provides the rationale for hesitating and indifference to abstinence."

Another respondent observed:

> "There is a step before the knowledge and resources which is the awareness. I need to realise and be aware of the importance of m-learning through training courses offered by the university clarifying the importance of m-learning, the most important applications used in my specialty, its impact on teachers' academic and educational level, and how it is potentially possible to raise the performance of both professors and students."

This theme joined together several issues regarding the resources that all the interviewees agreed must be available to them in order for them to successfully use m-learning. One of these was the lack of good infrastructure, such as the availability of high-speed internet, smart phones and tablets for both teachers and students, which, in turn, was reported to reduce teachers' willingness to adopt mobile learning. In addition, they all agreed that the existence of a team that could help teachers programming apps to use on mobile devices would support the creation of effective mobile learning environments.

Also, some participants believed that the existence of apps that served different subjects might help speed up and advance teachers' m-learning readiness. Finally, the issue of a lack of Arabic digital content was considered as an obstacle to the adoption

of m-learning by two participants. The informants held that improving this content could help teachers to change their traditional practices.

9. The Availability of a Technical Support Team

For this theme, the faculty members were given a free space to express whether they considered it essential to have a support team that would help them address any problems that may occur during m-learning. A high-grouped response stated that they did not have any support teams for m-learning, and that a support team would be important if they were using m-learning. In addition, they said they would value technical support specialists who were available to solve any problem twenty-four hours a day throughout the university term, which, in turn, would help to shorten the time they would need to spend preparing and delivering m-learning.

10. The Existence of University Encouragement

The presence of university encouragement was interpreted differently from one faculty to another, based on the faculty members' needs and views. Some thought university encouragement would involve providing expert programming teams to help in developing Arabic digital content and transferring their curriculum to a digital format. The informants repeatedly commented that the university could make apps that related to their discipline available so that their students would enjoy using their mobile devices more than traditional textbooks. One interviewee from the faculty of medicine stated:

> "There may be specific applications related to my discipline and, if I use them, my students [would] absolutely enjoy using their mobile devices more than traditional text books, especially when it gives the student the opportunity to see text, images and videos at the same time and at one place. I hope to find a team that programmes some applications in my specialty, because we miss the digital content that serves our subjects and we miss specialists who are able to help the educators in transferring the knowledge and textbooks into digital content. I am very excited to develop my way of teaching and I wish that there

> are specialists [that] could help me to develop my curriculum digitally and have a go to try a new method with my students using mobile learning."

On the other hand, some interviewees held that university encouragement should take a financial form, stating that without a financial reward, teachers won't be motivated to use m-learning in their teaching practice. However, two respondents flipped the issue of encouragement from the university to the students, suggesting that the student is ready for m-learning, but that the university administration has been slow in implementing it:

> "In fact, we are now seeing that the student encourages the university to use m-learning and not vice versa. Infrastructure is available and can be easily developed, but we urgently need to convince the doctors of the importance of mobile education and its benefits and ease of use. I mean that the student is ready for m-learning, but the university administration is slow in its implementation, and all those who use m-learning, including myself, are doing it personally. Also, planting m-learning within the primary and secondary education levels paves the way for its use at college and university level."

Three faculty members thought that the university's encouragement for using m-learning should be comparable to its encouragement for using other electronic administrational systems, that it should make the use of m-learning compulsory for all teachers, and that it should let students evaluate the teachers' achievements at the end of each semester.

> "It seems that university's encouragement is very weak and limited regarding the use of m-learning. In fact, the university encourages the use of the administrative electronic system 'Anjez'. However, there is no encouragement to use mobile learning. I imagine that if the university is encouraging teachers to use m-learning [was] similar to its encouraging to use 'Anjez', most of the teachers would deploy m-learning in their teaching practices."

This faculty member added:

> "M-learning should not be voluntary, it should be a key requirement of the university teacher assessment at the end of the academic semester. It must be

kept in mind that students should assess their teacher and they should be asked: do your teachers use m-learning, and how was the outcome?"

11. Faculty and Students Trialability

Most interviewees expressed a belief in the importance of trialability for the use of any technology in teaching, which they attributed to psychological factors. The faculty members expressed the belief that the motivation of teachers to try new modes of learning (such as m-learning) is grounded in a broader motivation and disposition to innovate. Pointing out that people do not learn passively, they stressed that the experience of both teacher and student must be taken into account. If a person has a strong internal desire to practice something, they may attempt to no matter what. If it is a fairly weak desire, they will only try to do it if it is also easily accomplished. In addition to the sample of quotations in Table 5.3, some other quotations were as follows:

> "I think it is not only the case for mobile learning, but all aspects of life need a psychological motivation, which is a susceptibility to try and get ready for the psychological experience and looking for a change, innovation and good experience in all areas of specialization or work."

> "I think the most important factor is the personal factor for the person himself as how he looks to modern devices usage that have many developed and existing capabilities in a very easy and simple way".

Other informants emphasised that the existence of good support, such as knowledge and resources, would encourage teachers to try new teaching methods and break with their habitual routines. Moreover, they added that the teacher cannot adopt m-learning if their skills in the use of mobile devices (or technology more generally) are weak, as they do not want to devote a significant amount of time trying to use something that they are not already familiar with.

However, two participants claimed there needs to be a serious desire from the faculty and students to develop m-learning, so that Saudi faculty members can keep up with developed countries. They mentioned that their students are willing and able to try

new methods of learning using their mobile devices. Although they are aware of the potential for the misuse of mobile devices, they think that it is important to consider how to use mobile devices in education and to look for ways to benefit from their use, and only one faculty member was not able to interpret this matter as he was being neutral. As one respondent put it:

> "Education is [the] self-directed learning of any student, which means that students learn in their suitable time and from way they want. However, if that happened without the good direction from the educator, the learning cannot achieve the educational successes. I think the most important benefits of implementing m-learning is the speed of transfer the information from one party to another without the presence of office hour barriers or communication barriers. I think mobile learning develops self-learning."

12. Teachers' Resistance to Change

Different insights on resistance to change included the idea that the impact of social norms reaches to teaching in schools, colleges, universities, and even at home, with students and teachers getting used to one way of teaching – "paper & pin" – which makes both teachers and students unsure about whether this is the right way of teaching and learning. One participant added to this, stating:

> "The students and their parents are not sure whether deploying technology within education represents a form of learning or entertainment. Arab society is accustomed to these devices being used for chatting and entertainment rather than for education."

Furthermore, the idea that mobile device are used for entertainment makes some parents, students, and educators doubt the effectiveness of using them for education, especially when they do not realise the importance of their adoption. Hence, teachers resist implementing and blending m-learning within education.

Moreover, there can be a tendency amongst many different groups to hold stereotyped views regarding people's ages – for instance, that people over the age of 50 do not like to learn things about modern technology because it needs skills they don't have, and

will take too much time to learn. It is worth noting that this view *was* expressed by some younger participants (aged less than 40), whereas only two participants of 50 or over said that they do not have time to learn new teaching methods, and that they perceived the classical teaching method to still be effective.

13. Teachers' Levels of Mobile Device Usage Skills

The teachers espoused the importance of having good skills for adopting m-learning in their teaching. In addition, they suggested that not all subjects and/or colleagues need to have the same degree of skills, as some disciplines involve more simple face-to-face modes of teaching, whereas others require the teachers to have more advanced technological skills. One detailed view expressed was as follows:

> "I think the skills vary depending on [the] specialty of each teacher – for example, in some disciplines, such as Islamic studies, the teacher teaches the fundamentals of jurisprudence and he can use technical skills at the same time. However, this material can be explained effectively in face-to-face mode and without the use of technology and, in the end, both methods achieve the same goal. While in my specialty (Faculty of Communication and Media), the nature of the explanations linked with media such as photos, audios, videos (and editing them), visual recording, directing, and lighting. Therefore, I must have a high skill in the use of technology. The question here is: are we look to the faculty member of Islamic Studies as an unknowledgeable and unskilled teacher who needs to learn technical skills in order to equate him with the faculty member of Media Studies? I guess that's prejudice against him. Different materials vary and thus the degree of required skills vary too".

On the other hand, most teachers claimed that the reason for teachers' lack of skills in m-learning are due to their 'nescience' of the benefits of m-learning in general. Three participants compared the use of mobile devices with the use of PCs and the internet in the last decade – i.e. how many faculty members resisted using them, but then raced to adopt them when they understood their benefits and usefulness. Moreover, informants stated that everyone who has a technological skill is psychologically motivated to use and employ that technological skill in all areas of life, including

education (see Table 5.3 for the sample quotation). However, if their skill level in an area is low, that will prevent them from achieving in that area, and encourage them to return to traditional methods of teaching.

Some faculty members suggested that one solution for solving the issue of a lack of m-learning skills was to provide training courses for university teachers for developing and enhancing their technological skills.

14. Levels of Students' Mobile Device Usage Skills

Although this research is primarily interested in discovering the skills that teachers have in the use of m-learning, the interviewees talked about the skills of both teachers and students, and hence this theme was added. Two faculty members stated that students need technical skills to use mobile devices in learning. However, most of them did not consider this to be an issue for students as they are digital natives.

Nonetheless, half of the participants expressed the view that mobile device ownership is an issue for students. They noted that two important factors that must be put in place before mobile devices can be successfully used in m-learning (in addition to students having the required skills) are that mobile devices that are adequate for use in m-learning can be purchased for affordable prices, and that multiple programmes are provided on different systems for both students and educators.

5.3.2.2 The data-driven inductive coding approach

The data-driven inductive coding approach was developed for this study to allow themes to emerge from interview data that described and expanded on ideas from the research's conceptual framework. The inductive type of thematic data analysis provides a systematic method for analysing a set of field notes that enables credible answers to research questions to be generated. The codes label a piece of text that contains information that is repeated several times in the interview data. Contrary to the theory-driven deductive coding approach – in which the themes and categories are decided in advance – data-driven codes define the themes that respond to the collected data (Cohen et al., 2011). Here, coding is performed for behaviours, perceptions,

issues concerning the interviewees, and relationships data. This type of coding allows the data to be searched and retrieved based on similar and frequently repeated data.

Several steps were taken to code the data. First, the different data sets were read and the comments were taken and underlined. Next, comments were summarised and coded in order to form clear descriptions and meanings from the data. Initial code labels were developed and similar data were searched and assigned to each part of the code labels. Next, overlapped, similar and redundant codes were rejected, which allowed the developed codes to reveal common themes and recurring patterns (Kibelloh and Bao, 2014). The interview transcripts were repeatedly read and analysed for new themes and categories to guarantee that no essential thoughts were overlooked. Finally, the themes were grouped to develop general categories. A diverging radial diagram was built to illustrate the common codes developed through the inductive coding approach (see Figure 5.2).

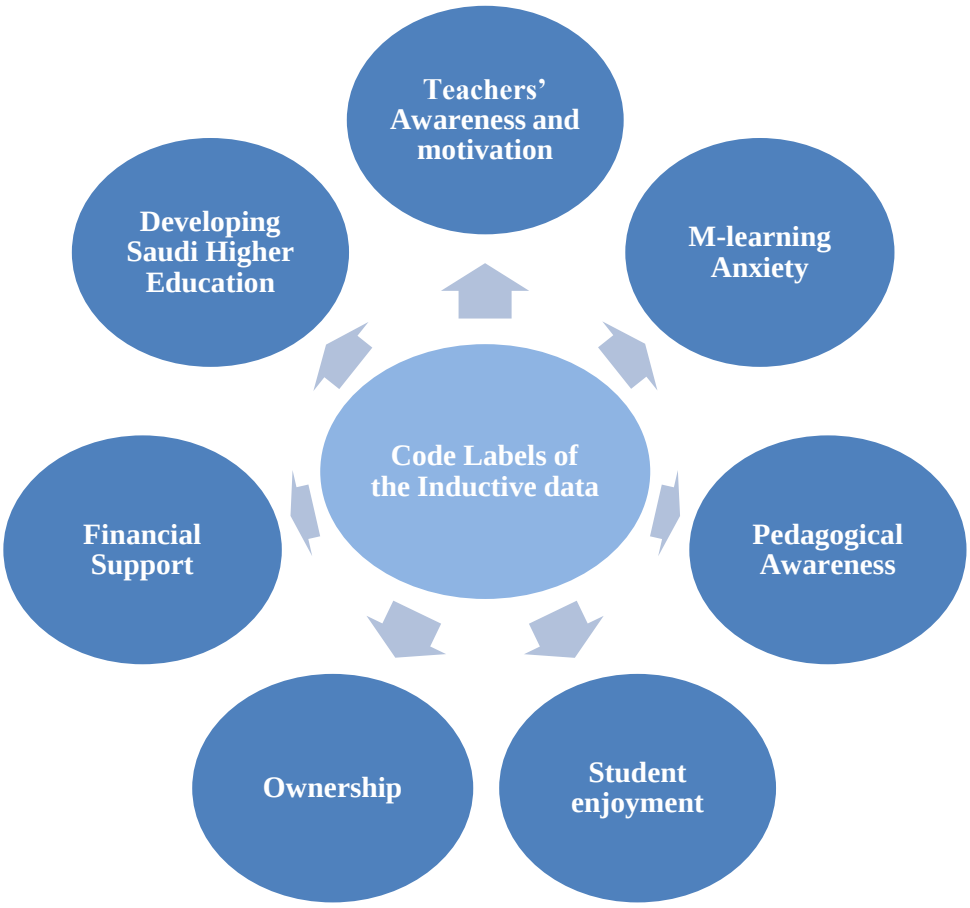

Figure 5.2: Codes developed from the data-driven inductive approach

Figure 5.2 was then used to shape the data in Table 5.4, which includes seven themes, descriptions of these themes, and some samples from the interview transcripts.

No	Data-Driven Codes	Description	Data from Interview 1
1	**Teachers' Awareness and motivations**	This theme codes the motivation and willingness of teachers to adopt m-learning in their professional practices.	I have this motivation … [as] I am a teacher who hates traditional routines in teaching, and I aim to development my teaching methods. Although the social norms impact on our life, we are encouraged to adopt m-learning and [are] willing to encourage others.
2	**M-learning Anxiety**	This theme codes the faculty's feeling of discomfort and fear of coping with the features of mobile devices when they are used for teaching and learning.	I see some lectures felt threatened and overwhelmed when using technology in classrooms because their technological capability is low. I cannot use technology in front of my students – they are much more expert than me, and I feel anxious when I make a mistake.
3	**Developing Saudi Higher Education**	This theme codes the teacher's beliefs regarding the outcomes of using m-learning in	I perceive m-learning as a new and suitable era of developed education and it does not clash [with] the social norms.

		developing Saudi higher education.	
4	**Enjoyment Factor**	The teachers' views concerning whether mobile devices represent an enjoyable tool for students to use in learning.	Students enjoy using their mobile devices more than traditional textbooks, especially when it gives the student the opportunity to see text, images and videos at the same time and at one place.
5	**Pedagogical Awareness**	The faculty members' views on whether mobile devices could be tools that are supported by pedagogical principles.	I made a group of WhatsApp and asked any willing students voluntary to join the group. This activity was mainly to support self-directed learning. I made a discussion group using [the] WhatApp app on smart phones and, overall, the group was a good way to communicate with students.
6	**Financial Support**	This theme illustrates the faculty's perceptions on the need for financial support from the government to deploy m-learning.	M-learning needs more financial support from governments and educational institutions to provide us with technical tools and good infrastructure.
7	**Ownership of Mobile Devices**	This theme shows the obstacle of ownership among	Not all students have smart phone enabled internet connections.

		students, and consists of the issues of the lack of mobile devices and internet connectivity.	The inequities between students [would] lead to [an] unfair integration of mobile learning.

Table 5.4: Data-driven codes with segments of text from the interviews (Inductive Approach)

The above table shows the codes that were generated from inductive thematic analysis. Each row has its own explanation, and sample quotes were imported from the interviews data. The numbered data rows are discussed and explained in further detail in the following paragraphs.

1. Teachers' Awareness and motivations

This theme codes teachers' positive motivations and willingness to adopt m-learning within their professional practice. The faculty presented their willingness to adopt this type of technology as they understood the benefits of using m-learning and the drawbacks of continuing to use traditional teaching methods alone. In addition, they stated that using m-learning would develop their professional performance and enhance their learning environments. Although they believed that Saudi social norms impact negatively on their professional lives, they were encouraged to adopt m-learning and were willing to encourage others to do so as well. A sample of lecturers' citations is presented in table 5.4.

However, some teachers expressed a lack of motivation and willingness to adopt m-learning within their professional practice. There were only two professors (aged over 50 years) that declared that they were not encouraged to adopt mobile technology in their teaching, and believed that m-learning was ineffective and time consuming, requiring a burdensome amount of effort and acquisition of skill to learn how to integrate it into traditional teaching practice. Other teachers commented that, in their departments, there are some lecturers that still own old cell phones, and they do not

want to buy new smartphones because they do not know how to use them, or are not interested in the new technology. One sample quotation was:

> "Some teachers in my faculty still own old-fashioned phones, and they do not want to buy a new smartphone because, basically, they may not know how to use it, and they may not want to learn a new technology."

2. M-learning Anxiety

This theme codes the faculty's feeling of discomfort and fear of coping with (the features of) mobile devices when they are used for teaching and learning. Twelve faculty members did not present any type of anxiety when using technology in general in classrooms, in particular, if they planned to use or already used mobile devices for teaching and learning. However, these participants stated that some lectures do feel threatened and overwhelmed when using technology in classrooms because they lack technological skills. Only five interviewees expressed the view that they cannot use technology in front of their students because their students are much more expert than them, which results in them experiencing anxiety if they do not use mobile devices properly (see Table 5.4 for sample quotations).

3. Developing Saudi Higher Education

This theme coded the teacher's beliefs regarding the outcomes of using m-learning in developing Saudi higher education. The faculty who were willing to adopt m-learning perceived there to be many advantages of deploying m-learning in classes, considering it as part of a new era of educational development. In addition, some viewed the use of m-learning as an appropriate solution for the lack of Saudi higher education outcomes, particularly the lack of student knowledge and skills, which hinder them in securing good jobs and, in turn, may increase unemployment in the Saudi labour market. However, three professors, aged from 50 to 59 years old, did not perceive this lack in higher education outcomes, and expressed the view that the traditional face-to-face method of teaching is the best way for students to improve their knowledge.

4. The Enjoyment Factor

Although the enjoyment factor was not covered in the questionnaire or the interview questions for this thesis, a number of faculty raised this theme in the interviews. This theme presents the teachers' views regarding the status of mobile devices as enjoyable tools for student learning. Many faculty members stated that learners enjoy using their mobile devices more than traditional textbooks, especially when it gives the student the opportunity to see text, images and videos at the same time and at one place.

5. Pedagogical Awareness

This theme aimed to show the faculty members' insights regarding the use of mobile devices as tools for supporting students' self-directed learning. It was mentioned only by interviewees who used m-learning with their students, and they expressed the view that creating group discussions through WhatsApp or exploiting other mobile applications for different uses was important for letting the students take 'the helm of the ship'. However, they always repeated the problem of the lack of training courses to feed them on how to deploy m-learning, and on the resources that are available for their specialities.

This theme also captured teachers' beliefs regarding m-learning being a good form of communication between them and their students from a pedagogical perspective. Many respondents stated that they had created discussion groups using smartphone apps to offer a way to communicate with students and to move beyond 'one-sided communication'. One faculty member stated:

> "I used [an] m-learning activity as a means to move from the 'one-sided communication' to 'two-sided communication'."

However, there were five faculty members that considered the idea of using mobile devices as communication channels for learning purposes to be inadvisable.

6. Financial support

Some teachers suggested that several factors need to be considered before m-learning can be successfully implemented within Saudi higher education. One common factor

was the financial implications for both teachers and students. This theme illustrates the faculty's perceptions of the need for financial support from the government to deploy m-learning. The participants highlighted the need for financial support from the government and for educational institutions to provide them with technical tools and good infrastructure to set up m-learning schemes in Saudi universities.

7. Ownership of Mobile Devices

A number of faculty members observed that the cost of mobile devices is prohibitive for some students, and that using m-learning could thus lead to inequities between students. Also, some teachers have old cellular phones and find it difficult to change to smartphones because they are not familiar with the new technology. Some interviewees commented that economic factors and standards of living need to be investigated for both students and teachers as they held that the acquisition of a mobile device with a value of $500 would certainly influence the adoption of m-learning in higher education settings. It is worth noting that half of the participants expressed the view that mobile device ownership by students was an issue for using m-learning.

> "One [more] important factor, [other] than student having skills, is to provide mobile devices to students at affordable prices."

5.4 Conclusion

This chapter has presented the results of the qualitative part of the questionnaires, discussed the evaluation of the online interviews through the pilot study and presented the data from these interviews, together with an analysis of the data collection process and a discussion of the reliability and validity of the data. The first part of this chapter explored the main themes that resulted from the qualitative part of the questionnaire, outlining the three main categories – the attributes that encouraged respondents to use m-learning, the barriers that discouraged them, and the future encouragement for adopting m-learning. In addition, each category was shown to have several themes, which were all analysed using an inductive approach.

The second section began by evaluating the quality and utility of piloting online interviews as a data collection method for the current study. Synchronous online

interviews were undertaken with four university teachers using Adobe Connect. The pilot study indicated that Adobe Connect was an excellent and innovative communication platform and a good tool for interviewing for both the current research and future research with certain constituencies. In general, the pilot study for the e-interview was very useful, with the interview questions achieving what they aimed to. Although there are some potential difficulties for online interviewing, such as the timing of the interview and its destruction, the pros of online interviewing were argued to outweigh its cons.

After the pilot study, the main interviews were conducted, and the reliability and validity of the data collected from these were discussed. Combining both deductive and inductive data analysis methods provided advantages, generating several themes that could be used to answer the research questions more fully. The data collection process explained the factors and reasons behind the faculty members' decisions to adopt such technology. The next two chapters discuss the quantitative and qualitative results from the survey and interviews that were presented in Chapter Four and this chapter, respectively.

Chapter 6 : Discussion of the Quantitative Results

This chapter provides a discussion of the quantitative findings presented in Chapter Four, looking at the factors affecting faculty members' acceptance of mobile learning in detail. It starts by verifying the research's theoretical framework, and then discusses each factor with relation to the current and future use of m-learning. In addition, the correlations between the seven factors are explored. The chapter finishes by discussing the demographic data with respect to the participants' intentions to use m-learning currently and in the future.

6.1 The Research's Theoretical Framework

A large body of literature on m-learning uses the Unified Theory of the Acceptance and Use of Technology (UTAUT) (Venkatesh, Morris, Davis & Davis, 2003). However, one limitation of m-learning acceptance studies is that most of the research for them has been conducted in Western contexts only (Schepers & Wetzels, 2007; Traxler, 2007), which generates little evidence about the deployment of the UTAUT in other cultures. The factors used by the UTAUT, and possibly by other measurements, may be moderated by cultural and national variables (Van de Vijver & Leung, 1997). Hence, this research provides an important attempt to investigate the UTAUT and extended constructs relating to it within a non-Western culture – in this case, in the context of Arab higher education.

The model utilised in this research extended the UTAUT successfully, and this extended factor – the relevance of social norms – makes it unique. In addition, the model accurately identified the variance in the intentional use of m-learning as comprising 70.3% (R^2) of faculty members' intentions to use m-learning. These results were consistent with Venkatesh et al.'s (2003) findings, with their model indicating that the UTAUT explained approximately 70% of the variance of behavioural intentions. However, lower explanatory influences were found by other studies –

64.5% by Wang & Shih (2009), 63.1% by Al-Gahtani, Hubona and Wang (2007), and 39.1% by Teo (2011) respectively.

Internal consistency reliabilities were found to be between 0.6 and 0.9 through quantitative data analysis, which is consistent with other studies (Al-Gahtani et al., 2007; Bandyopadhyay & Fraccastoro, 2007; Habboush, Nassuora & Hussein, 2011; Nassuora, 2012; Teo, 2011; van Raaij & Schepers, 2008; Wang & Shih, 2009). Based on the binary logistic regression test's output, the full model containing all the predictors (performance expectancy, effort expectancy, social influence, facilitating conditions, perceived trialability, perceived social norms, and resistance to change) was found to be statistically significant, although different findings to this were generated in prior research. This section will discuss the quantitative findings that were produced in Chapter Four, and synthesise these findings with the extant literature. The discussion will be structured based on the order of the data analysis and the research questions.

6.2 The Current and Future Use of M-learning

The participants in this research were split into two groups based on their intentions to use mobile learning in their current and future practice. Group 1 comprised the participants that do not currently use m-learning but want to use it in the future, and Group 2 comprised the participants who currently use m-learning and want to continue using it in the future. Although 56% of participants from the sample (n=279) actively used smartphones, tablets, and/or laptops in their teaching and learning, the actual use to which they put this technology and the frequency of its use were not clear. Some may have been using m-learning in a very simple way, and the likelihood of this was quite high given the lack of resources, knowledge, and university support for implementing the use of portable devices within the educational context. In addition, it was predicted that faculty members were not fully aware of the potential of m-learning, or how to deploy it in their professional practice.

It was also not clear whether students were using their smartphones inside classrooms, or whether there were barriers (such as social norms or low ownership of mobile devices) preventing them from doing so. However, an optimistic finding showed that 44% of the faculty reported that they were willing to adopt m-learning in the future.

As a number of social networking applications such as WhatsApp and Twitter have become very popular for social communication amongst the Saudi youth population, the opportunities for deploying these apps within educational settings are very good (Al-Shehri, 2013), provided the factors that impede faculty members' adoption and use of mobile devices in teaching and learning can be successfully addressed.

Figure 6.1 shows the correlation between the model's constructs and the faculty members' intentions to use mobile learning in their current and future teaching practice. In addition, it recognises the correlations and interactions between the research model's constructs. This research reveals that performance expectancy, effort expectancy, social influence, facilitating conditions, perceived trialability, perceived social norms, and resistance to change were all statistically significant, and had a direct impact on faculty members' perceptions about using m-learning, both now and in the future. However, in estimating the unique independent effect of each of the potential predictors on the two groups, the binary logistic regression results indicated that facilitating conditions, perceived trialability and perceived social norms were more likely than the other factors to influence respondent-preferences relating to their use of m-learning in current and future pedagogical practice, and this was moderated only by their skills in using mobile devices.

As stated earlier in the literature chapter, a significant body of research has studied the factors that influence students' acceptance and usage of mobile learning, but only a small number of studies have investigated teachers' perspectives in relation to factors that impact upon their adoption of m-learning in higher educational contexts. Hence, both the literature in relation to students' and teachers' acceptance of m-learning will be included in the current study. Understanding the interaction between the factors that different studies reveal to have an impact upon their participants' adoption of m-learning in different settings helps to verify what has been integrated into the model used for this research. More detail will follow about this in the subsequent sections.

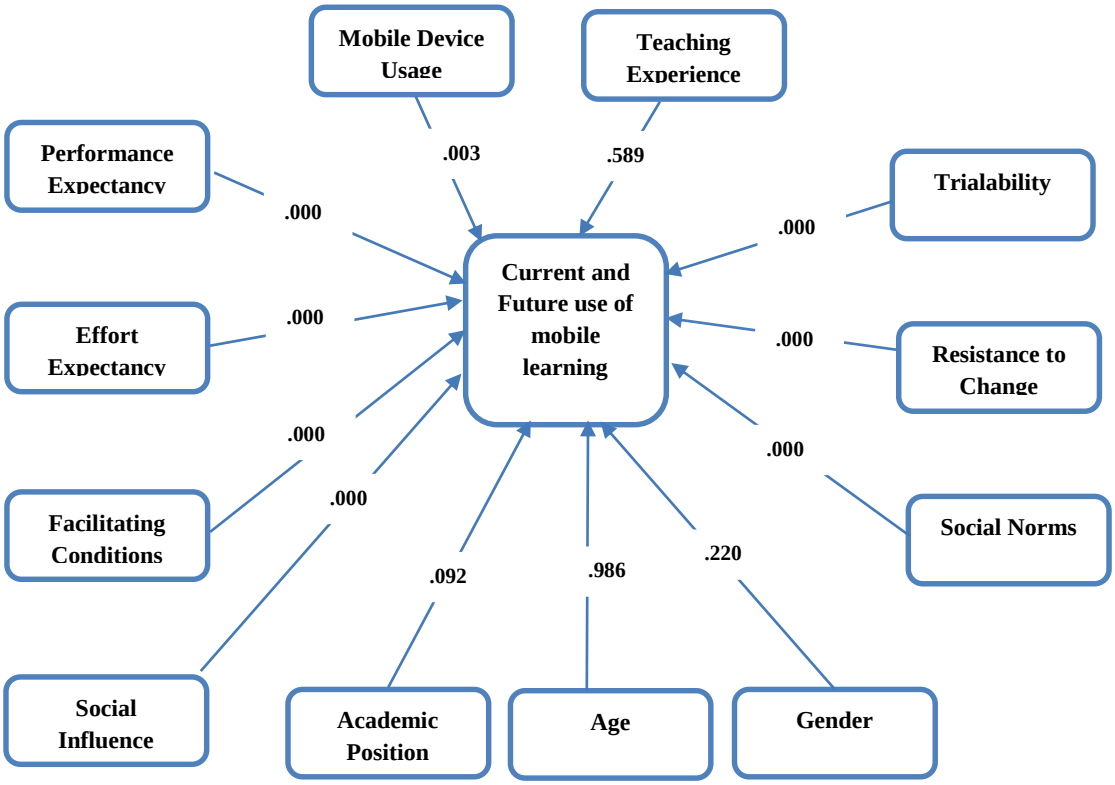

Figure 6.1: The most significant moderators of the intention to use m-learning

6.3 The Influence of Performance Expectancy on M-Learning Acceptance

Performance expectancy has been defined as "the degree to which an individual believes that using a given technology will help him/her to attain gains in job performance" (Venkatesh et al., 2003). It combines extrinsic drive, job-fitness, perceived usefulness, expected results, and comparative benefits (ibid), and relates to perceived usefulness in TAM. According to the data analysis results, the faculty members who perceived the idea of integrating m-learning into their teaching performance to be a good one were more likely to intend to adopt m-learning in the present and in the future.

A number of studies were conducted to test the relationship between UTAUT constructs and the acceptance of technology. However, most of them were based on learners' rather than teachers' perceptions, and concluded that there is a positive relationship between performance expectancy and the user's behavioural intention to

use m-learning (Al-Gahtani et al., 2007; Bandyopadhyay & Fraccastoro, 2007; Im, Hong & Kang, 2011; Iqbal & Qureshi, 2013; Nassuora, 2012; Wang & Shih, 2009). Nonetheless, their findings are consistent with Venkatesh et al.'s results (2003), as well as those of the current research. This suggests that performance expectancy is significantly positively influenced by faculty members' adoption of m-learning in their teaching practices, although Jairak et al. (2009) did not observe this effect in their research.

Based on the results of the current research, it appears that educators with high performance expectancies (i.e. those who believe that using m-learning in their teaching will be beneficial to them) have a tendency to accept m-learning more than faculty members with lower performance expectancies. The ability to use mobile devices to support learners to achieve their missions inspires a quicker acceptance of this technology (Akour, 2009). MacCallum et al.'s (2014) research generated contradictory findings to the current study, however. In exploring the factors that determine lecturers' acceptance of mobile technology, they found that the perceived value of the new technology (its performance expectancy) was one of the critical factors affecting behavioural intentions to use mobile learning, but that it had a *negative* impact on intention to use m-learning in the cohort they studied. Other research has also found that lecturers' beliefs regarding the value of the new technology is the main factor that influences their adoption of technology (Wang, Wu & Wang, 2009; Kebritchi, 2010). MacCallum et al.'s (2014) study, however, found that the reason that performance expectancy had a strong impact on teachers' intentions to use m-learning was that they did not believe that integrating m-learning with their other approaches to learning would either improve or enhance their students' learning or help the students to engage in planned activities using mobile devices. In addition, the teachers in this study did not perceive the adoption of mobile learning technology to be useful for their professional practices, nor did they perceive it to provide opportunities for improving teaching performance. Instructors need to believe that digital tools are easy to use and helpful for both their teaching and their students' learning in order to adopt them (MacCallum et al., 2014).

These outcomes point to the need for educational designers, scholars, and universities to concentrate on disseminating information about the advantages of deploying mobile

devices in learning. Instructional designers need to remove technical obstacles to their use in order to ensure that all mobile learning initiatives are as accessible as possible, with as little initial learning as possible being required to utilise them effectively (ibid). While institutes and researchers need to deliver effective IT support, access to training and pilot initiatives before a major rollout can be undertaken, institutions also need to promote the benefits of the mobile learning initiative so that they are clear and evident to all parties (ibid). This can be organised by confirming that lecturers are aware of the advantages that mobile learning offers for supporting their students' learning as well as their teaching (ibid). Lecturers should also be provided with opportunities that enable them to explore mobile learning for themselves.

6.4 The Influence of Effort Expectancy on M-Learning Acceptance

Effort expectancy refers to "the degree to which a person believes that using a particular system would be free of mental effort" (Venkatesh et al., 2003). It pertains to the perceived ease of use in TAM. It is evident that effort expectancy has a direct positive influence on intentions to use technology (Bandyopadhyay & Fraccastoro, 2007; Chiu and Wang, 2008; Im et al., 2011; Jairak et al., 2009; Nassuora, 2012; Wang & Shih, 2009). More specifically, earlier research has demonstrated that perceived effort expectancy is a crucial factor in teachers' choices regarding learning to use new technologies (Wang, Wu & Wang, 2009). In the recent mobile learning literature, MacCallum et al. (2014) also found that perceived ease of use played a major role in teachers' adoption of m-learning.

However, my research results showed some inconsistencies with these previous studies. The influence of effort expectancy on teachers' intentions to use m-learning was negative in this research, which means that the faculty members faced difficulties in using and implementing m-learning in their teaching practices, and only a small proportion of participants agreed that using m-learning was easy. Other lecturers stated that the applications of m-learning were neither clear nor understandable, and that they needed significant skills development to learn how to use mobile learning effectively in higher educational classes. And it is true that in order to influence the lecturers' acceptance of new technology, they need the skills to use this technology and to learn how to incorporate it into their professional practices (Pianfettil, 2001). In addition,

the effective application of mobile learning is less about the mobile device and its features, and more about users' technological skills, including their capability to access, manage, and assess digital resources (Chen & Denoyelles, 2013). According to Ktoridou et al. (2007), faculty members from disciplines with technical natures or links seemed to have the requisite knowledge to use the technology provided by mobile devices, although they still lacked the ability to incorporate m-learning into the curriculum. They also found that faculty members in Greek higher education find it difficult to apply m-learning in their classes due to a lack of training, knowledge and skills.

6.5 The Impact of Social Influence on M-Learning Acceptance

Social influence refers to the extent to which individuals feel that others believe that they should do something – in this case, use m-learning technology (Venkatesh et al., 2003). Akour (2009) conceived social influence in relation to m-learning to represent the degree to which "instructors or immediate faculty members directly stimulate or encourage their students in using mobile learning services". In this research, however, the social influence to use m-learning is understood in terms of students' and colleagues' influences on their faculty's attitudes to using it. Earlier research contended that social influence is a strong predictor of behavioural intentions to use new technology (e.g. Venkatesh and Davis, 2000), and that technological acceptance is influenced by the user community (Miller et al., 2003).

A large body of research has concluded that social factors have provided a positive influence on the use of m-learning (Bandyopadhyay & Fraccastoro, 2007; Im et al., 2011; Jairak et al., 2009; Wang & Shih, 2009). Likewise, the current study revealed a positive impact of social factors on faculty members' intentions to adopt m-learning. However, about 68.5% of lecturers were not influenced by their peers to use these new methods of teaching, and did not observe any usage of mobile learning in their departments. Nonetheless, more than half of the participants (57.7%) believed that their students were willing to have m-learning integrated into their classes, with 33.3% being neutral, and only 9% disagreeing with this hypothesis. The faculty members' decisions to adopt and use m-learning may thus be influenced more by their students than by their educational peers. In addition, the results revealed that half of the faculty

members were neither influenced by their departments nor by the university administration to adopt this new and innovative approach to teaching and learning.

As mobile learning has not been widely adopted in KAU, lecturers do not encourage their students to use it. However, a large majority of the lecturers stated that they would be willing to adopt m-learning if they received support from their university administration. What's more, they cited students, colleagues, departments, and the university as all being possible elements that could encourage them to use m-learning in the future. It was evident that the influence of teachers and students using mobile learning would demonstrate its usefulness and ease of use, and that this would positively influence teaching staff in choosing to use it as well (Donaldson, 2011). The faculty offers recognition and rewards for academic work, and thus has an influence on the value that students can accord to using mobile devices for learning (ibid). Once educators agree to implement m-learning, they can use their social influence to encourage their peers to use it as well, thus facilitating the diffusion of m-learning (Wang et al., 2009). It is noticed that the amount of late adopters is likely to increase quickly once the numbers of their peers who use mobile learning increases (Rogers, 2003).

6.6 The Influence of Facilitating Conditions on M-Learning Acceptance

Facilitating conditions relate to the extent to which the individual believes that the institution and infrastructure are available to support the use of innovation (Venkatesh et al., 2003). Four indicators for facilitating conditions relating to the use of mobile technology were considered in this study, comprising the resources and knowledge necessary to use mobile learning; the existence of a dedicated team; and the university administration's encouragement to use mobile learning. There is general agreement on the positive impacts of facilitating conditions (ibid). Venkatesh et al. (2003) suggest that if an organisational and technical infrastructure exists to support mobile learning and knowledge-sharing, then learners will be likely to use mobile devices for learning more often, and the same can be argued with respect to educators.

In line with earlier studies (Naismith, 2004; Venkatesh et al., 2003; Wang and Shih, 2008; Concannon, Flynn & Compbell, 2005), the current study also found that

facilitating conditions had a positive impact on the faculty members' intentions to adopt m-learning. It is worth noting that, out of the model constructs, facilitating conditions were the third highest predictor of faculty members' adoption of m-learning. Therefore, the lecturer's decision to adopt and use mobile learning is influenced by her perception of the availability of support services and resources for delivering mobile learning (Mtebe and Raisamo, 2014). Research has shown that the provision of resources, training, and information to users has a substantial and positive effect on both their satisfaction in using information technology and mobile learning and on their behavioural intentions to use it (Naismith, 2004; Venkatesh et al., 2003; Wang and Shih, 2008; Concannon, Flynn & Compbell, 2005). Van Biljon (2006) states that where a basic infrastructure or organisational context for the uptake of new technologies is lacking, the facilitating infrastructure then becomes more important. Ktoridou et al. (2007) noted that faculty members resist using m-learning with undergraduate students because of the lack of a necessary infrastructure and the time that would thus be required to learn how to integrate it into their current teaching and learning practices.

Disappointingly, the research findings uncovered that faculty members lack the resources and knowledge required to use m-learning, and that they had rejected offers of assistance and encouragement from the university administration. The results indicated that the lecturers were less likely to engage in mobile learning experiences when they perceived there to be a lack of infrastructure and mobile learning support. However, simply providing resources and knowledge does not guarantee m-learning usage (Donaldson, 2011). Educators need to grasp the power of m-learning – for instance, through knowing how to access learning materials and resources via mobile devices, through searching for information and developing learning efficiency using them, and through seeing how they are beneficial for other academic tasks (ibid).

6.7 The Influence of Perceived Trialability on M-Learning Acceptance

Trialability concerns "the degree to which an innovation may be experimented with on a limited basis" (Rogers, 1995, pp.15–16). In this study, trialability is understood in relation to the degree to which mobile learning can be experimented with before it

is adopted by teachers and students. This construct was imported from Diffusion Innovation Theory (DIT; Rogers, 2003). Although previous studies did not show that trialability had significant effects on lecturers' intentions to use technology (Lancaster & Taylor, 1988; Sheng et al., 2011; Joo et al., 2014), from the seven independent factors in this study, perceived trialability was the second most significant predictor of lecturers' attitudes towards their current and future intention to use m-learning. Trialability has a positive influence on faculty members' behavioural intentions to use m-learning, which means that the more that the teaching staff try mobile devices in their teaching and learning – through, for example, uploading lectures, downloading and/or uploading assignments, quizzes, communicating with students, and/or sending feedback – the more likely they are to adopt it once it is integrated. In addition, some members of the faculty were aware that their students have the ability to accomplish certain learning tasks using mobile devices, such as listening to lectures, downloading and uploading materials, and/or chatting online. This means that the majority of the faculty members thought that m-learning technology should be subject to trials.

These findings comport with those of Alhawiti (2011), who found that the faculty lacked experience of testing web-based distance education (WBDE) in Saudi Arabia, and he recommended that Saudi higher educational institutions provide faculty members with the opportunity to try this kind of education before fully implementing it. Trialability is essential, since it enables instructors to practice trial and error in advance, which in turn helps to decrease the level of teacher concern over m-learning (Joo et al., 2014). In this study, however, few educators faced a significant obstacle to trying m-learning and/or perceived that their students were unable to try using mobile devices for learning.

From the learners' point of view, KNIPA (2012) found that 37.2% of the online university students in South Korea are in their 40s or above, suggesting that one-third of the learners may need a significant amount of trial and error experience in order to use mobile applications for learning. In addition, Wishart and Green's research (2010) was concerned with the ease with which students could capture images and upload them to their virtual learning environments, and whether they perceived mobile devices to be useful in supporting learning. This research found that if there are no chances for trialability, or for prior practice by both educators and students, the

diffusion of m-learning might take a long time, as first-hand experiences are often what lead to positive decisions towards adopting m-learning. Providing teachers with opportunities to try out new technologies may encourage them to use them in their teaching. Consequently, trialability has a significant influence on faculty choices to adopt or reject m-learning. In addition to their needs to trial m-learning, faculty members often do not have sufficient information on what is suitable to use in their subjects, and how to deploy mobile technology in their teaching practices. Thus, the university ought to offer further support for instructors – for instance, by providing courses that allow trial and error testing and increase skills in using mobile learning applications.

6.8 The Influence of Perceived Social Norms on M-Learning Acceptance

Social norms are the rules of behaviour that are considered acceptable in a group or society (Sherif, 1936). Norms are cultural products (including values, customs, and traditions) that represent individuals' basic knowledge of what others do, and what others think they should do (Sherif, 1936). In the context of this study, perceived social norms represent the degree to which the individual believes that social norms impact on the use of mobile devices for teaching and learning. In the quantitative data analysis, support was provided for the hypothesis that there is a strong negative relationship between social norms and faculty members' behavioural intentions to use m-learning in their current and future teaching practice in Saudi Arabia. In addition, social norms were the most significant predictors out of all the factors in the research model concerning faculty members' intentions to use m-learning both now and in the future.

These findings suggest that a faculty member who is more influenced by social norms is less likely to intend to use m-learning in her current or future practice, which is surprising given that the nation's culture is favourable towards adopting new technology. Culture is believed by many researchers to have a bearing on outcomes relating to the adoption of technology (Avgerou, 2000). Nevertheless, social norms differ from one nation to another, and what applies to one country may not apply to another, unless they both share a similar social culture and geographical area. In this

case, the Saudi social norms that can be seen in other Arab countries, as well as in non-western nations such as Pakistan and Malaysia, were investigated.

In Western literature, there is a lack of research concerning social norms and the use of mobile learning in relation to both students and teachers, and the same applies to the Arab literature in this area, where there are very few studies exploring the influence of Saudi social norms on technological acceptance (Almarwani, 2011; Al-Shehri, 2013). Some research mentions the influence of social norms on the adoption and use of technology in general, but that research is focused on organisational conditions (Al-Oteawi, 2002; Loch et al., 2003; Baker et al., 2007; Al-Kahtani et al., 2006; Al-Gahtani et al., 2007). Baker and his colleagues (2007) noted that Saudi Arabia provides a good example of a country with intellectual and cultural traditions relating to demographic variables that differ significantly from those seen in Western cultures, and which have a significant impact on the attitudes and subjective norms that influence behavioural intentions towards the use of technology. In addition, Straub and his colleagues (2003) recognised the complexity of Arab culture in their studies, and detailed how technological transfer and acceptance depends significantly on Arab social norms and culture in organisational settings. However, neither Straub's studies nor those of other bodies of literature cover the critical factors of Arab social culture and norms with regard to the integration of mobile learning in higher educational contexts.

Loch, Straub and Kamel (2003) observe that moral, religious and cultural issues are of great concern to Arab Internet users because of the increase in unethical sites that exist on the internet. It is evident that a country's culture, values, beliefs, and behavioural patterns are connected to its IT adoption (Avgerou, 2000). Almarwani (2011) and Al-Shehri (2013) examined the influence of social norms and culture on faculty acceptance of mobile learning technology in Saudi higher education settings, but this body of research did not contribute to understanding the impact of social norms on teachers' intentions to adopt mobile learning. Instead, it encouraged the use of m-learning as a solution to certain cultural issues – such as replacing the use of closed-circuit television, which is time and money consuming, with the use of portable devices to enable male teachers to teach female students, circumventing the segregation between men and women in education, allowing communication between them, and expanding the border of traditional classrooms, particularly for female

students who have duties toward their families. Although portable devices facilitate greater access to a large array of learning resources for their owners, and address several cultural concerns, the authors did not consider the barriers to deploying such new technological trends within Saudi higher education.

As little research has been undertaken on social norms and m-learning in Arab countries – and there have been few real interventions on mobile learning technology in Saudi universities – this acts as an inhibitor to the acceptance and use of m-learning, with Saudi teachers having concerns regarding the integration of mobile devices into their teaching practices – the main one being the possibility of students misusing mobile devices in class. These two 'social norm concerns' have thus significantly influenced educators, making them reluctant to use m-learning in their teaching in the immediate future, although they may still want to use it in the future *if* certain conditions are met, which will be discussed in greater detail in the next section.

Although some staff and students in Saudi universities have conservative attitudes regarding the use of mobile devices equipped with a camera, and this negatively impacts on the adoption of mobile learning in classrooms, the respondents were divided on whether this was an issue, with half 'agreeing' and the other half 'disagreeing' that it was problematic. That is, some educators were willing to use new teaching methods utilising mobile devices, and were not influenced by social norms. In addition, the privacy of women in Saudi society significantly negatively influenced the group of participants who reported that they did not want to use m-learning at present, but would want to use it in the future under favourable conditions. This was evident in the findings of Almarwani (2011) and Al-Shehri (2013), who both believed that 'traditional cultural norms' are one of the distinctive challenges facing the use of mobile learning in Saudi tertiary education. However, neither of these research projects provided deep explanations of how social norms impact on teacher and learner adoption of m-learning.

In a study on technological transfer, Wishart and Green (2010) emphasised some of the challenges involving socio-cultural barriers that are, from their point of view, ones that have a higher probability of negatively impacting on the use of m-learning than technical barriers do. They provide examples of concerns about privacy, loss of data,

disruption, and the need to always be available to students. One issue for the uptake of mobile learning is the need to generate "an appropriate cultural climate within the institution involved" (Wishart and Green, 2010), which will require all the parties involved to agree to certain ground rules. It is accepted that the irresponsible use of mobile devices is disruptive, and America and India have both banned students from using them in schools (ibid). However, according to Wishart et al. (2007), such bans can also have a negative impact on the staff's motivation and willingness to trial new technologies for supporting learning, even when they are not themselves restricted from doing so. Thus, cultural beliefs and attitudes toward technology need to be better understood if the technology is to be appropriately adapted to the behavioural norms and standards of the country that will use it, rather than attempting to "force-fit" the culture to the technology (Loch et al., 2003).

Due to the limitations of extended research, further data were collected and analysed in the interviews in order to better understand the connected issues relating to social norms and their influence on faculty members' adoption of m-learning in Arab nations. This information will be discussed in depth within the qualitative discussion section.

6.9 The Influence of Resistance to Change on M-Learning Acceptance

User resistance to change has been found to be a critical factor in preventing organisational improvement (Cooper & Zmud, 1990; Csizmadia, Enders & Westerheijden, 2008; Gong, Xu & Yu, 2004; Joshi, 1991; Kwahk & Lee, 2008; Triventi & Trivellato, 2009; Zilwa, 2007). In addition, the degree of user resistance to change has been found to be linked with the degree of the user's technological acceptance (Kim & Kankanhalli, 2009; Manzoni & Angehrn, 1997; Nov & Ye, 2008). Nov and Ye (2008) add that in studies associated with "people's behavior in the context of change and innovation", their resistance to change is often used to measure "the specific change-related behaviours above and beyond other related personality characteristics" (p. 846). In the context of this study, resistance to change is understood in terms of the degree of a lecturer's willingness to adopt mobile learning within their teaching practice.

The results of this research indicate the existence of a strong relationship between resistance to change and academic teachers' intentions to adopt mobile learning, both in their current and future learning and teaching practices. Research by Balash, Yong and bin Abu (2011) has revealed that a large proportion of lecturers still show resistance to using technology for learning and teaching within the classroom. In the higher educational arena, Huang et al. (2012) indicated that user-resistance to change has a significant, negative influence on the adoption and use of m-learning, which is consistent with my findings. In addition, Wishart and Green (2010) reported that resistance to change has come to be considered to be a critical concern amongst faculty members – in particular, in relation to worries about disruptive changes, such as how new social practices could impact upon lecturers' and tutors' personal time if transferred to learning contexts, as well as worries about data security and privacy. The data analysis of this research reveals that most faculty members, particularly older teachers, were unaware of the benefits of blending traditional teaching methods with m-technology in an educational environment and how this may improve both students' learning and the quality of teaching performance. Although traditional methods of teaching do not fit the requirements of the digital age, some older professors cling to such methods, and this generates a significant obstacle to the integration of m-learning.

For teachers with higher levels of resistance to change, prior technological studies have shown that there is a positive link between their willingness to adopt new technology and the institutional support that is provided to them (Chae & Poole, 2005; Demetriadis et al., 2003; Hu, Clark & Ma, 2003). Training support could be a useful way to help decrease educators' resistance to using m-learning and to increase their acceptance of it. In order to maximise learning effectiveness, instructors need to know and understand the benefits of using this type of technology with their learners, and this is done through supporting them with sufficient skills and knowledge via training courses.

Teachers that are resistant to changing from the use of traditional learning methods are less likely to benefit from integrating mobile learning with their traditional classes (Huang et al., 2012). And since the complementary use of m-learning in university campuses is primarily dependent on teachers' adopting this method of learning, the resistance to change of academic teachers also has an impact on student results. In

student-centred learning environments, the blending of technology inside traditional learning settings may play a key role in improving student learning success and effectiveness, with several studies indicating that there is a positive correlation between students' academic achievements and the integration of technology into learning sceneries (Kopcha, 2010). According to Cruz et al. (2012), although many educators perceive m-learning to have the potential to enhance communication with students – as well as the resources and speed of feedback available to them – many also identify technological, institutional, pedagogical, and individual obstacles to the use of m-learning in academic contexts, which has a potentially negative influence on mobile learning acceptance. As educators have higher levels of resistance to change, it is possible that they could have less favourable current and future intentions to use mobile learning because they do not utilise mobile devices highly in general.

6.10 The Correlation Between the Seven Factors

Additional analysis tests were conducted in order to determine the significance of the relationships between the seven factors as an additional theme of interest to this research. It is worth mentioning that the prior studies that used UTAUT theory only explored the correlation between PE and EE, and none of them extended this exploration to the relationships between other factors. The data presented in table 4.10 illustrated strong correlations between most of the constructs. A strong positive relationship was found between the PE variable and the EE, FC, SI, PT, and RC variables, which means that the affect of one variable is strongly correlated with the affect of a number of other variables. As stated earlier, a number of studies examining the relationship between performance expectancy and effort expectancy have reached similar conclusions (Venkatesh et al., 2003; Jairak, Praneetpolgrang & Mekhabunchij, 2009; Wang, Wu & Wang, 2009; Abu-Al-Aish & Love, 2013) to those of this research, finding a strong positive correlation between the two ($r = .629$, $n=279$, $p = .000$), with high a level of performance expectancy being associated with high levels of effort expectancy. That means that the faculty members who perceived m-learning to be beneficial and effective were also more likely to perceive it to be easy to use.

The implication of this finding is that universities must pay more attention to providing instructors with abilities and knowledge though offering training sessions so that they

can develop the m-learning culture and take advantage of its implementation. Because most educators are not professional specialists in technology, they are often unprepared to incorporate mobile technologies into their teaching (Chen & Denoyelles, 2013). Bearing in mind the fundamental role that mobile learning has in higher education, researchers and institutions must thus pay more attention to instructors' immersion in the mobile learning experience and their awareness about its efficiency. Understanding the relationship between the skills needed for using m-learning and the usefulness of deploying it could lead to teachers' making progress with it in the future.

However, there is no comprehensive body of research that examines the correlation between other factors. Hence, this research provides a good reference for authors who are wishing to do so in future research. This thesis has shown that, in addition to the relationship between performance expectancy and effort expectancy, there is a significant positive correlation between performance expectancy and all the factors except social norms, as this has no relationship with any of the other constructs. The existence of strong relationships means that the faculty members who perceived m-learning to be beneficial and effective were also more likely to perceive there to be a good environment for deploying m-learning, to be able to be influenced by their colleagues and students, to be trialable, and to be more likely to change from their traditional methods of teaching to blended m-learning.

Similarly, effort expectancy was found to have a significant correlation with facilitating conditions and trialability, although this correlation starts to diminish with social influence, perceived trialability, and resistance to change. Again, this means that the faculty who saw m-learning as being easy to use were more likely to perceive the current environment to be supportive of its use and to be trialable. Moreover, facilitating conditions were found to have a strong positive relationship with both social influence and trialability, and social influence to have a relatively strong positive relationship with trialability. However, social norms played a neutral, individual, but influential role that was unrelated to any other factors. Thus, regardless of its significant impact on faculty intentions to use m-learning, it seems that its effect will continue to exist as it is detached from the influence of other factors.

6.11 The Association between Demographic Data and M-Learning Acceptance

The demographic data were found to be crucial determinants of teachers' adoption of technology (Sahin, 2006). Guy (2010) found that gender, academic seniority, age, teaching experience, and experience with technology may all influence the individual's use of technology. The demographic survey data for gender, age, academic qualifications, years of teaching experience, and mobile device usage skills were examined, and the findings of the statistical test results for intention to use mobile learning indicated that 'mobile device usage skill' was the only variable to contribute significantly to the model, with $p < .05$ ($p = .003$). This indicates that a person's decision to use m-learning in their current and future teaching and learning is most heavily influenced by their *ability* to use it. An odds ratio Exp (B) = 1.252 was recorded, which indicates that the more skilled a person is in using mobile devices, the more likely they are to intend to use m-learning in their current and future teaching practice. The results indicate that other personal characteristics do not influence the respondents' intentions to use m-learning.

However, the additional data analysis results indicated that effort expectancy and resistance to change were affected by age. Performance expectancy, effort expectancy, perceived social norms, and resistance to change were all associated with level of academic qualification. In addition, performance expectancy, perceived trialability, and resistance to change were all correlated with years of teaching experience, whilst performance expectancy, social influence and resistance to change were influenced by mobile device usage. However, gender was not found to make any difference in relation to any of the constructs.

6.11.1 Gender

The demographic data were analysed to explore whether there were any significant differences between males and females in relation to their intentions to use mobile devices for teaching and learning. Based on the T-test results (as indicated in Chapter Four), the hypothesis that gender has a direct impact on predictor-independent variables of faculty behavioural intentions to use m-learning was rejected. This suggests that there is no significant difference between the acceptance of mobile

learning by males and females. This was unanticipated, as prior studies that surveyed gender differences in behavioural intentions to use technology did find significant gender differences (Mitra et al., 2000; Ong, 2006; Whitely, 1997). In addition, some investigations found that gender has a significant impact on users' attitudes toward computer and e-learning use, with males scoring higher than females and having a higher intention to use them (Mitra et al., 2000; Ong, 2006; Whitely, 1997; Ho and Kwok, 2003; Bina and Giglis, 2005; Wang et al., 2008).

This research has also generated unexpected results with regard to social norms, finding that there is no statistically significant difference between the impact of social norms on male and female users of mobile learning. This means that both male and female faculty members are equally influenced by social norms in adopting or rejecting m-learning in both their current and future teaching practice. A similar conclusion was reached by Baker et al. (2007) when they conducted research to examine the effect of gender, age, and educational levels on the implementation of new technology in a Saudi organisation using the Theory of Planned Behaviour, who found that gender and age were not significant moderators of the influences of attitudes and subjective norms on behavioural intentions in Saudi cultural samples. In addition, Al-Gahtani et al. (2007) surveyed 722 workers using desktop computer applications in Saudi Arabia, and their results showed that there was no interactive effect between the UTAUT constructs and gender in relation to user intentions to adopt technology. This fits with the results of Igbaria and Nachman (1990) and Al-Gahtani and King (1999), who used a British sample of students, and found there to be no significant relationship between gender and any of the TAM indicators for computer acceptance. Gefen and Straub (1997) found gender differences in the perceptions towards e-mail using a sample of end users from North America, Asia, and Europe, which indicated that women and men differed in their perceptions of e-mail, but not in their use of it. However, Al-Gahtani (2004) found that women reported a lower degree of computer usage and satisfaction. Although the previous studies were conducted on technology acceptance, none of them explored the influence of social norms on users' intentions to use m-learning. Hence, the reasons behind the acquisition of these results are relatively vague, and further investigation is required. The next section will

demonstrate how interviewees' perceptions and concerns about social norms and culture influence their adoption of m-learning.

This research hypothesised that gender differences would be correlated with strong and significant differences in behavioural intentions to use m-learning, and that male faculty members would have a higher average level of intention to use m-learning than female faculty members due to female teachers being generally less experienced and more influenced by social norms in this area. However, even with regard to the other suggested factors in this research, this hypothesis was, surprisingly, rejected. In contrast to my findings, Wang et al. (2009) found that gender differences do moderate the effects of social influence and the self-management of learning on the intention to use m-learning and, unexpectedly, that the effect of social influence on behavioural intention was significant for men but insignificant for women. This latter finding conflicted with the results of prior research (Morris & Venkatesh, 2000; Venkatesh et al., 2000; Venkatesh et al., 2003), which found that social influence is a stronger determinant of technology adoption for women than it is for men because women are less likely to be influenced by their peers. Similarly, Guy (2010) found that male teachers were more positive about using m-learning than female teachers.

However, further justifications for these findings were not explored in the literature. According to my results, developers of technology instruction should target male and female educators equally when designing new schemes for learning to use mobile devices, and should provide suitable and attractive learning materials for both genders (Wang et al., 2009).

6.11.2 Age

According to the quantitative data analysis, age was not a significant moderator of intention to use m-learning in comparison to other demographic dependent variables. This conflicts with previous research (White & Weatherall, 2000; Czaja & Lee, 2001; Billipp, 2001), which found that age does have a strong relationship with the intention to use mobile learning. In addition, Al-Kahtani et al. (2006) investigated the perceptions of twenty-four female faculty members at four higher educational institutions in Saudi Arabia regarding the use of the internet, and discovered that variances in perceptions towards the internet and its use varied strongly between

different age groups and academic disciplines. Some scholars also provided evidence to support the hypothesis that older users have a lower intention to use computers than younger ones (White & Weatherall, 2000; Czaja & Lee, 2001; Billipp, 2001). However, Guy's (2010) results agreed with those of the current research in finding that age does not play a significant role in m-learning acceptance among teachers.

Nonetheless, when this research tested age across the independent factors in the theoretical model, it was found to have a strong impact on effort expectancy and resistance to change. This means that there was a statistically significant difference in effort expectancy scores when $p < .05$ ($p = .035$) between the 30–39 age group and the 50–59 age group, with the latter group perceiving m-learning as not being easy to use. In addition, it is worth noting that, in this study, resistance to change was more significant for the older respondents than for the younger ones, particularly in relation to the 50–59 age group, who produced a more statistically significant result ($p = .015$) regarding resistance to change than the under 30 age group.

Wang et al. (2008) found that effort expectancy and social influence were significant for older adults. Handheld devices such as smartphones also have media and application-rich capabilities, and it was therefore expected that there would be differences between age groups relating to intentions to use mobile learning (ibid). Despite the fact that young adults are more frequent users of m-learning than older ones, Smith (2010) found that nine out of ten 18–29 year old adults were considerably more likely than the younger age group (under 18 year-olds) to adopt mobile data applications, with 65% accessing the internet from their cell phones. Although social norms are significant predictors of faculty members' adoption of m-learning, the age variable did not have any effect in determining attitudes to using it. Nonetheless, Al-Gahtani et al.'s (2007) results did indicate that culture is a significant moderator of technology acceptance amongst Saudi users, and that this influence diminishes both with increasing age and increasing years of experience with computers.

6.11.3 Academic Qualifications

The data analysis for this study found that there was no relationship between the participants' academic qualifications and their intentions to use mobile learning in their current or future teaching and learning practice. However, performance

expectancy, effort expectancy, perceived social norms, and resistance to change were all influenced by the level of participants' academic qualifications. This means that there was a statistical significance in performance expectancy scores between participants who held a doctoral degree and those who held bachelors and masters degrees. It was indicated that the participants holding bachelors or masters degrees perceived m-learning to be a more useful tool for teaching and learning than those holding doctoral degrees. This links back to our earlier finding regarding the influence of teachers' ages on their attitudes to adopt m-learning, as academic qualifications are strongly related to faculty members' age groups, with the younger group having less academic qualifications than the older group, who all held doctoral degrees.

In the Saudi higher education context, Alhawiti's results (2011) showed that academic position and level of education were significant predictors of faculty perceptions about whether financial concerns provided a barrier to the adoption of web-based distance education. In this study, however, there were marked differences in effort expectancy scores between faculty members who held doctoral degrees and those who held masters degrees, which indicates that the group that have masters degrees recognise the ease of using m-learning more than the other group does. Interestingly, teachers with bachelor degrees differed significantly from those with doctoral *and* masters degrees in terms of the influence of social norms. That is, the teachers with bachelor degrees were not influenced as much by Saudi social norms as those holding higher degrees. Finally, the doctoral faculty members were significantly more likely to resist change than faculty members with masters degrees.

6.11.4 Years of Teaching Experience

In this thesis, performance expectancy, perceived trialability, and resistance to change were significant determinants of years of teaching experience. Specifically, the analysis of the data revealed that participants who had less than five years teaching experience perceived m-learning to be more useful and trialable, and were more likely to change from traditional methods of teaching than the group that had twenty years or more of teaching experience. There were no significant differences among other teaching experience groups in relation to the seven constructs that were tested.

These results demonstrate and establish that younger faculty members with less teaching experience are enthusiastic and willing to try, deploy, and change to new brands of teaching in their professional lives, have the willingness to try using mobile devices for teaching, and encourage the adoption of m-learning among their students more than the educators with significant teaching experience. On the other hand, faculty members with more than twenty years teaching experience find it difficult to change the way in which they have taught over this period, and think that the traditional methods they use are effective for learners, who can easily interact with traditional textbooks and other paper or PowerPoint slides and learning materials, failing to realise the practical skills and experiences their students could gain if they utilised more innovative methods. Although it is difficult to convince such educators to try new methods of teaching using mobile devices, policymakers and institution administrators must encourage all educators in the process of professional development so that all can benefit from contemporary educational innovations. These skills and approaches would then, in turn, be transferred to new generations of students, changing the traditional teaching cycle by creating a new technological generation who are able to employ mobile technologies in all aspects of their lives. In addition, this would meet the requirements of the global economy and, in particular, the Saudi labour market, which is conditioned and challenged by the changes in the Saudi educational system, and would enhance the breadth and standards of graduate students' skills (Al-Asmari, 2008; Alzu'be, 2012; Baki, 2004). Alzu'be (2012) emphasised the need to modernise the curriculum together with the traditional methods of teaching, and to follow the successful alterations made by others in using alternative educational methods that have proven their effectiveness. Other studies have proved the benefits of using mobile devices for changing the way in which teaching is undertaken and for providing a richer depth of educational experiences (Chen et al., 2008; Corbeil and Valdes-Corbeil, 2007; Kim et al., 2006; Kukulska-Hulme, 2009; Morris, 2010; Morris et al., 2012; Sharples et al., 2009).

6.11.5 Characteristics of Mobile Use

Earlier studies concluded that experience is a crucial predictor of users' behavioural intentions (Igbaria, 1993; Igbaria et al., 1995). A User's experience with technology was defined as "the amount and type of computer skills a person acquires over time"

(Smith et al., 1999, p.227). Users' previous experiences impact upon their capabilities to use new technology (McGeoch and Irion, 1952), play a significant role in their technology acceptance (Bhattacherjee & Premkumar, 2004), and make systems easier to adopt for them (Karahanna et al., 2006). Venkatesh & Bala (2008) noted that when new technology is reliable and flexible, it is more likely that its users will have less "system-related anxiety" because of their prior experience. Cassidy and Eachus (2002) revealed that experience in the use of technology has an impact on the intention to use that technology, as well as on the actual use of it. In addition, Ball and Levy (2009) found that experience had a significant influence on educators' adoption of developed instructional technology.

The data analysis to address the third research question revealed that mobile device usage was the only significant predictor from the personal characteristics of faculty members regarding their behavioural intentions to use mobile learning in their current and future teaching practice. Specifically, the results of the analysis demonstrated that performance expectancy, social influence and resistance to change were all influenced by mobile device usage. This is consistent with the findings of Vankatesh et al. (2003), who concluded that effort expectancy and social influence have a greater influence on behavioural intentions to use technology at an early stage of the experience of using that technology.

The results pointed out that the majority of participants were familiar with at least some of the simple functions of mobile devices (for example, calling and texting; sending emails; taking photos or videos and sending them to other people, or uploading them online; downloading and playing games or applications from the web; and accessing their social networking page). However, few participants were able to perform complex tasks requiring a higher level of expertise (for example, creating and editing audio and/or video files and publishing them on the internet). Akour (2009) found that the more skilled and experienced students were in browsing and searching on smartphones, the higher their level of behavioural intention to use m-learning was, and the more they perceived it to be easy to use and useful. Hahn (2008) encourages the shift to using internet mobile learning to help decrease the digital divide among users who do not have PCs.

In a study on undergraduate students, it was found that less than a quarter of the 309 participants never accessed the internet on their mobile devices, but only 19% accessed library resources and e-books on their mobile devices (Donaldson, 2011). The author attributed these findings to the devices' limitations, service plans, a lack of interest or awareness, and other personal reasons (ibid). This is taken to suggest that inadequate access to online learning sites on mobile devices may perhaps influence users' attitudes towards m-learning and their adoption of it. However, a limitation of this study is that it does not pay enough attention to other complex usage patterns for mobile devices, such as teaching uses, or to ways of exploring the frequency with which faculty members' use the internet via mobile tools. MacCallum et al. (2014) concluded that the skills of lecturers in using m-learning is a major and critical factor in their adoption of it, and advise teachers that they will need a good foundation in basic technology skills if they are to successfully utilise it. More qualitative data was gathered and analysed with regard to the important skills needed by faculty members and their relationship with m-learning acceptance, and this will be discussed in the following chapter.

6.12 Conclusion

This chapter has discussed the data that was gathered through the quantitative part of this research. It started with an explanation of the research's theoretical framework and showed how it fits well with all the suggested factors, and how they have significant correlations with faculty intentions to adopt m-learning in their current and future professional practice. In addition, the research findings were discussed with relation to the proper literature, although more investigations and further explanations were found to be needed, which will be provided in the next chapter.

Chapter 7 : Discussion of the Qualitative Results

This chapter provides a discussion of the qualitative results presented in Chapter Five. This thesis employed a mixed methods approach, using the interview technique to help to expand on and explain the quantitative survey results. The previous chapter illustrated the discussion of the major quantitative findings, with a number of question marks being raised regarding issues that were found to affect faculty members' adoption of m-learning in higher education. Although all of the seven identified factors proved to have a significant influence on the educators' intentions to use m-learning in their current and future educational practice, social norms, facilitating conditions and perceived trialability were found to be the significant predictors of their behavioural intentions, and this was moderated only by their skills in using mobile devices. This chapter tries to explain the factors and reasons behind their decisions to adopt such technology.

In order to analyse the interview data, theory-driven and data-driven code approaches were also employed. A total of twenty-two themes emerged from the use of these two methods – fifteen themes coming from the theory-driven coding and seven themes from the outcome of the data-driven coding. Most of these themes were associated with the constructs of the research's conceptual framework based on the UTAUT and DIT, in addition to the two suggested constructs. Moreover, further factors that may influence the faculty's adoption of m-learning emerged from the data-driven code, and these were also discussed. Thus, the data gathered from open-ended questions in the survey phase will be presented and discussed here along with the information collected from the online interviews. Themes from the survey items will be joined with similar themes from the interviews to avoid duplication, and all the themes will then grouped into four categories: (a) current use of m-learning, (b) attributes of m-learning use, (c) barriers to using m-learning, and (d) future encouragement for using m-learning.

The online interviews conducted with the twenty university teachers generated responses signifying both optimistic and pessimistic attitudes towards adopting mobile devices for use in teaching and learning. The following section provides a discussion of the resulting themes and categories.

7.1 Teachers' Current Use of M-learning

It was found that mobile devices were not being fully utilised for learning in the Saudi higher education provided at King Abdulaziz University in Jeddah city. In addition, the use of m-learning seemed to be at a very early stage within Saudi higher education in general. Based on the qualitative data, the respondents were split into two groups – one group that did not use m-learning at all, and the other that used some (any) features of mobile devices in their teaching. Approximately half of the interviewees (n=10) stated that they did not currently use mobile learning (Group A), and they were also were divided into two groups. Group A1 (n=7) excluded m-learning due to their lack of awareness of what was available for educational use on mobile devices, either through apps that are developed for learning or via other means to implement m-learning across different subjects. A sample quotation from one faculty member from this cohort stated:

> "With regard to mobile learning technology, I do not have too much information regarding either apps that are developed for learning or other ways to implement m-learning, particularly in my subject."

However, faculty members who held this position expressed a willingness to deploy m-learning within their professional practices if they could gain knowledge of how to use mobile devices in teaching and learning, and thus were willing to increase their teaching capabilities in this way.

Various benefits that m-learning can provide for teaching and learning are provided in the literature, including its ability to improve the reliability of tasks and to enable space-less and timeless-learning (Becta, 2004; Kearney et al., 2012; Naismith et al., 2004; Sharples and Beale, 2003). As a result of these and other benefits that can be secured through adopting m-learning in teaching, Schuck et al. (2013) found that educators in higher education generally want to develop their skills and knowledge in this area in order to integrate it into their professional practices. In addition, Schuck et al. (2013) emphasised that educationalists need to be familiar with mobile devices' capabilities for providing learning practices and resources if they are to take advantage of the benefits they can provide for their students. The same study highlighted that

lecturers should also be ready to assess and critique instructional tasks in order to develop effective ways of teaching via smart phones and tablets (ibid).

The other group, A2 (n=3), also did not use m-learning, but believed that mobile devices should only be used for social communication, and that they are not fit for educational purposes. This accords with Anusca et al.'s results (2011), who also found that some faculty members did not see smartphones and tablets as being appropriate for teaching and learning. Having such perceptions may negatively influence these lecturers' attitudes and behaviour, leading them to reject all mobile technology for use in their professional practices. Thus, professional development training courses must be provided to both groups – A1 and A2 – and include education about the benefits of m-learning for teaching and learning, as well as information about how they can use it. That is exactly what interviewees expressed a need for in the interview phase to help them to adopt mobile devices in their professional practice.

The other half of the teachers, Group B, used mobile devices for learning and teaching purposes through WhatsApp and email. However, only one lecturer used Facebook and Twitter with his students as simple, extra platforms for learning and communication. Although only two of the interviewees noted that they used emails to follow students' homework and progress through smartphones or laptops, the rest used emails as an announcement space. University teachers tend to use these apps as they become more popular among the Saudi community. Nowadays, WhatsApp and BlackBerry Messenger apps attract many Saudis, and facilitate social contact and the sharing of thoughts and broadcasts (Al-Shehri, 2013). Hence, using these apps (or others) in higher educational settings would probably enhance teaching and learning performances for both educators and learners (Lam and Duan, 2012).

The widespread use of such social mobile services among young students provides a strong grounding for the adoption of mobile learning in Saudi Arabia. 60% of the Saudi population now use social videos apps such as keek via mobile internet (US Census Bureau, 2015), and hundreds of young enthusiasts have started pushing content. According to a World Economic Forum report (2015), the use of ICT in Saudi Arabia has produced important social effects which put pressure on the education system to change as well.

Although the advanced use of m-learning is cited in the literature on Saudi education (Al-Fahad, 2009; Alkhalaf, 2014; Al-Shehri, 2013; Nassuora, 2012), it seems that m-learning is used in a very elementary way to help educators accomplish simple tasks with their students. This is the result of a lack in the knowledge and resources required to successfully blend the use of smartphones and other mobile devices with the provision of face-to-face lectures (Naismith et al., 2004). In addition, a recent study has found that learners and lecturers need technical, logistical, and pedagogical support to incorporate smartphones and tablets into teaching and learning, both inside and outside campus (Chen et al., 2015). These themes and more will be discussed later in this chapter.

7.2 Attributes of M-learning Use

This section groups the results concerning the attributes that influence respondents in using m-learning in their current and future teaching practice. The themes were grouped according to participants' points of views regarding the advantages of adopting portable devices in teaching and learning.

7.2.1 Teachers' Awareness and motivation

Teachers' motivation and willingness to adopt m-learning in their professional practice is important for promoting their acceptance of it (MacCallum et al., 2014). Although negative attitudes to m-learning were seen amongst some faculty members – those who were not fully aware of the potential of this new teaching model – others were willing to adopt it because they understood the benefits of using m-learning and the drawbacks of continuing to practice traditional teaching methods. In addition, some believed that using m-learning would develop their professional performance and enhance their learning environments.

Having an m-learning scheme in tertiary education evidently does not guarantee its use and/or effectiveness. The perceived usefulness and the perceived ease of use of m-learning have been found to have a significant effect on faculty members' behavioural intentions to use m-learning in their current and future teaching practice (Akour, 2009; Ifenthaler & Schweinbenz, 2013; MacCallum et al., 2014). In addition to these factors,

the prior studied factors will clearly power teachers' motivations to adopt m-learning in Saudi higher education to some degree, and thus the speed at which they adopt it.

7.2.2 Developing Saudi Higher Education

The research participants perceived m-learning to provide many pathways for developing Saudi higher education. As stated earlier (§2.4), King Abdulaziz University has four core long-term goals, comprising developing standards of assessment for student performance, pursuing high-quality research and development programmes, gathering the trust of society and the corporate world, and the optimal investment of university resources and capabilities (KAU, 2015). I contend that introducing mobile devices into the classical education environment would provide a strong way of contributing to the achievement of these goals, since the adoption of m-learning would enhance students' academic performance (Morris, 2010), which, in turn, would increase the quality and standards of the institution. In addition, m-learning provides an appropriate solution for the lack of Saudi higher education achievement, particularly the lack of student knowledge and skills, which do not meet the requirements of the Saudi labour market (Alzu'be, 2012). To enhance and change Saudi university performance outcomes, the educational system and its methods for delivering information in teaching and learning must be reassessed – along with the conservative nature and culture of the community – in order to prepare both male and female educators and students for universal change (Alzu'be, 2012; Baki, 2004).

In addition, integrating m-learning into the educational system would enable instructors to improve their teaching styles and to move from traditional classrooms to more enjoyable environments. This integration could lead to 'research-led' or 'research-enhanced' teaching (Brew, 2002; Velautham and Picard, 2009), in which teachers can asses and evaluate the experience of using m-learning as a new method for teaching in Saudi contexts, and enrich the Arab literature on m-learning. That, in turn, would help to increase the quantity and quality of their research output, increasing the university's world-class rank, as teaching, research, knowledge transfer and international outlook are the main criteria that World University Rankings judge higher education institutions through (WUR, 2015).

7.2.3 The Enjoyment Factor

The 'enjoyment factor' was frequently cited by faculty members in both the survey's open-ended items and in the interviews. One of the attributes that encouraged younger lecturers in particular to use m-learning was that it offered students a number of opportunities both inside and outside the classroom. It is evident that those who perceive the use of a technology to be enjoyable are more likely to adopt it (Igbaria, Parasuraman & Baroudi, 1996; Venkatesh, 2000), and so it is important to consider the enjoyment factor when designing technological instructional systems (Kiili, 2005). The enjoyment factor is a stronger predictor of student adoption of a technology than it is for teacher adoption of it (Van der Heijden, 2004).

In addition, many faculty members considered m-learning to be valuable because they held it to offer interesting and enjoyable ways for students to explore new methods for helping them to learn, and thus that they would benefit from using technology that they are already strongly attached to (Sharples et al., 2009). Mobile devices provide a tool through which students can enjoy learning more than through traditional textbooks, as they give the student the opportunity to see text, images and videos at the same time, and in one place.

7.2.4 Pedagogical Awareness

The main route through which teaching staff and the university could be encouraged to use m-learning is via increasing pedagogical awareness about the benefits of teaching and learning using mobile technology. Using mobile devices for learning has the potential for increasing students' motivations to learn, and facilitates better interactions between teachers and students; improving ease of monitoring; keeping students' knowledge up-to-date with the digital age; increasing the availability of digital resources and reducing teaching loads; encouraging learning outside the classroom; and making learning materials available on the go (Sharples et al., 2009). The research revealed considerable agreement regarding how digital capabilities can contribute to facilitating knowledge acquisition, such as through the use of stimulation videos and podcasts to help medical students in their learning (Vogt et al., 2010). Features provided by mobile devices, such as cameras and audio and video functions, provide ways to boost student understanding and exploration in their learning (Looi et

al., 2010). In addition, the incorporation of mobile devices into the teaching and learning process facilitates the learning functions for both teachers and students. M-learning could provide an alternative way for both educators and students to understand and simulate the teaching methods used overseas.

Moreover, mobile devices provide a useful tool for supporting self-directed learning, discussion, and reflective thinking skills (Moeller and Reitzes, 2011). Using WhatsApp for group discussion or carrying out other tasks using the many available mobile applications through which students can take 'the helm of the ship' can have a significant impact on the way that they engage with learning contents. As Lave et al.'s (1991) 'situated learning paradigm' contends, learning does not merely involve the individual acquiring knowledge, but also involves a process of social participation. Brown et al. (1989) introduce the notion of 'cognitive apprenticeship', in which the teachers (the experts) work together with the students (the apprentices) to create scenarios in which the students start working on problems before the nature of the problems are made explicit to them. Situated learning involves knowledge being presented to learners in authentic contexts (in settings and through applications where that knowledge would usually be found), thus enabling them to 'participate within a community of practice'. Portable devices provide educators with the potential to 'transform learning into a seamless part of daily life, to the point where it is not recognized as learning at all' (Naismith et al., 2004: 5), which means that they need to change their perceptions of themselves from that of being the providers of information to that of being facilitators of learning materials (ibid).

Moreover, professors' attitudes towards technology and their control over it have a major influence on learning outcomes (Webster and Hackley, 1997; Dillon and Morris, 1996). Becker (1999) found that educators who adopt student-centred approaches to teaching and learning are more likely to use technology in learning environments. Therefore, instructors should start to explore the potential of this technology, and try to enhance their ability and skills in using it. Additionally, the university administration should try to boost educators' willingness to adopt m-learning.

Furthermore, m-learning was perceived by the faculty to provide a good means of communication between faculty members and their students. Discussion groups using the WhatsApp mobile application offer a good way for students to communicate amongst themselves, as well as with their professors. In addition, they enable 'one-sided communication' to be transformed into 'two-sided communication', as one participant noted. There were few participants that did not hold that mobile devices provided overall benefits as a communication channel for learning purposes.

7.2.5 Gender Differences

In a surprising finding, the research showed that there are no significant gender differences in faculty members' views on factors that impact on their adoption of m-learning. This result is consistent with a body of earlier research (Baker et al., 2007; Al-Gahtani and King, 1999; Al-Gahtani et al., 2007; Igbaria and Nachman, 1990), but in conflict with the findings of other studies (Mitra et al., 2000; Ong, 2006; Whitely, 1997). Some research found that gender has a significant impact on users' attitudes towards the use of information technology, with males scoring higher than females, and having more of an intention to use it as well (Al-Gahtani, 2004; Bina and Giglis, 2005; Guy, 2010; Ho and Kwok, 2003; Mitra et al., 2000; Ong, 2006; Whitely, 1997; Wang et al., 2008).

In Saudi higher education, and in the context of m-learning, however, the gender differences have started to fade, as the effects of the determinants on behavioural intentions for both male and female faculty members are similar for a number of reasons. One of these is that Saudi female faculty members have probably become more experienced and skilled in using advanced m-learning technology. They perceived the use of portable devices in teaching to be valuable and possible, and shared similar insights with the male teachers regarding the barriers that they face in employing m-learning. Baki (2004) claimed that there are many restrictions placed on Saudi women's jobs by limiting a number of subjects in their educations. However, this was more the case in the last decade than it is today, with women in Saudi Arabia now having equal opportunities to men in education and within the higher education sector – whether as teachers or learners – as well as in numerous other areas of the labour market, even though some jobs and disciplines in tertiary education are still not

yet accessible to women, and neither are jobs as electrical engineers and police officers. Accordingly, female university teachers have similar skills and abilities in accessing the potential of mobile devices and incorporating them into the educational system as male teachers do, and both genders' learners can benefit from this new trend of learning. Indeed, both genders might have the same perceptions and attitudes regarding the attributes and challenges of adopting mobile devices for use in teaching and learning.

There is still a pressing need to understand how males and females react to the influence of social norms in relation to the use of m-learning. The research in this area found in the literature (Alsadoon, 2012) suggests that there are no gender differences between Saudi male and female students' perceptions with regard to the use of mobile devices for learning. It is clear that both males and females live in one place (i.e. Saudi Arabia), in one culture, in one educational system, and are controlled by the same social norms. Thus, the education and information for both males and females comes from the same source, and the environment where both live is homogeneous. Hence, the acceptance and use of m-learning should not be influenced by gender at all.

In addition, the predominant view is that the contemporary social environment is more open, especially for urban women. Thus, the openness of Saudi culture to other cultures influences women, depending on their values and backgrounds, with some women being positively influenced by different cultures, whilst others still have the 'traditional' cultural shackles restricting them – restrictions that do not allow for the development of education.

It was suggested that the similarity between both genders' opinions was due to university regulations, stating that commands are always issued by the men's section and so women have little power here (Baki, 2004). That is, women have to just follow these commands, and have no decision-making power in relation to such issues due to the perceived weakness of women in making 'bold' decisions. Female participants attributed their 'towing the line' here to the fear of losing their jobs if they stated their opinions frankly, and reported that this is why they try to keep pace with the general resolutions in the university and refrain from expressing views that may attract unwanted attention.

Regardless of the reasons for there being no effect of gender on the adoption of m-learning in Saudi higher education, it might be good to consider the absence of gender differences as an attribute that encourages the integration of m-learning for both male and female faculty members. The university administration and policy makers thus do not need to take this factor into account when initiating and designing m-learning schemes. Thus, an equal environment and similar planning will be applied to both the men's and women's university sections.

7.3 Barriers to Using M-Learning

This category seeks to review the obstacles that the respondents reported as impeding their adoption of m-learning for their current and future teaching practice. Most themes were demonstrated according to factors based on the research's theoretical framework, as well as other factors that were proposed by the participants. According to the survey findings, all seven factors were significant variables, but only three factors – social norms, facilitating conditions, and trialability – were predictors of the faculty members' current and future intentions to use m-learning. However, the survey did not reveal the reasons behind these results, and hence interviews were undertaken to collect more in-depth data that could be used to generate a better understanding of these phenomena, as well as to find effective solutions to facilitate the future adoption and use of m-learning in Saudi higher education. This part of the chapter tries to combine all the themes that were acknowledged as barriers to using m-learning, and to discuss them in relation to the relevant literature.

7.3.1 The Conservativeness of Saudi Universities

More in-depth information was provided in the interview phase than in the surveys, revealing the significant effect of Saudi social norms and the conservative nature of Saudi universities regarding the adoption of m-learning. These influences were first revealed by Almarwani (2011), and later supported by Al-Shehri (2013), who both believed that 'traditional cultural norms' represent one of the distinctive challenges for using new technologies, such as mobile learning, in Saudi tertiary education. Although both studies encouraged the adoption of m-learning as a short-term solution, and discussed the challenges for doing so, they did not provide explanations about the

problems for using ubiquitous devices in learning, how the adoption of m-learning may influence Saudi social norms, and why this is the case in the Saudi nation.

According to the data presented in Chapter Five, a major finding of this research illustrated that the existence of the camera feature on most modern phones was the most frequent concern that participants had regarding the use of mobile devices in the classroom, with faculty members communicating conservatively with students using mobile cameras. Although mobile devices equipped with digital cameras are seen as acceptable, and even promoted in many regions to help students capture or video important learning content (Looi et al., 2010), this feature is also considered a potentially dangerous aspect for the application of m-learning in Saudi educational contexts. The reason for this fear is a lack of awareness in Saudi society regarding issues concerning the photographing, publishing, and copyrighting of images and videos, specifically when students photograph and/or film their peers or teachers without having their permission, and then distribute the images and/or videos on the internet.

One question to ask here is what impact this issue might have on Saudi social life. The presence of the digital camera on modern portable devices does not only concern the 'conservative Saudi', but is also a concern born from perceptions of students' misusing digital cameras and photographs. Thus, concerns regarding Saudi conservativeness, the misuse of mobile devices, and women's privacy all link together to form a spider's web of issues. The worst predicted scenario is that if married or single female teachers or students are imaged and these images are published on Facebook, for instance, then these women might be divorced as a result, or at least bullied by members of their close communities. The traditions and norms of Saudi society present unique challenges that are not found in Western nations (Almarwani, 2011). However, some Saudi females have more freedom in their lives than others, and may not have any concerns about the use of digital cameras and photographs.

Another scenario that was raised was the possibility of a (male or female) teacher being filmed – and the video uploaded or published – when the lecturer or students are making negative comments. In addition, students could video their teachers making errors or slips and upload these, exposing their weaknesses in academic performance,

and lecturers' awareness of this may make them more reluctant to use m-learning. However, a number of the male and female teachers that were interviewed regarding the use of cameras inside classrooms did not fear their presence. They considered that advertising good and bad teachers to students could enable the learners to choose the educators they considered to be the best. Some female teachers also accepted the use of cameras under certain conditions, in which the students were provided with permission to use them for a reasonable purpose in the class.

This is not the end of the story, as the use of mobile devices in campuses is dealt with by university rules and guidelines as well. The university's regulations in relation to the use of mobile devices inside classrooms need to be examined, as their use is permitted inside classrooms in some faculties and banned in others. Any initiation of an m-learning scheme needs to be very carefully planned, with consideration given to the cultures of the individuals, institutions, and communities involved. Clear guidance is required on the suitable use of portable devices by the university community, as well as any penalties for the misuse of them.

Solutions to limiting and preventing the publishing of photos and videos are proposed. For example, although social norms still present a barrier to some permissible behaviours, educators should start using and continuing to use mobile devices for learning, as well as for distributing the culture of m-learning among students and other educators who are reluctant to change which, in turn, may result in a positive accommodation of this new global trend. Also, creating clear regulations and guidance about the proper use of mobile devices for both teachers and students, and clarifying the penalties for breaking the rules, will help to increase teachers' willingness to use this technology. It is worth mentioning that, as a number of participants observed, only a few decades ago, the first appearance of satellites in Saudi society was widely opposed and fought. However, the Saudi society gradually started to accept the existence of satellites in their households and everyday lives. A similar situation may occur with the use of mobile devices within classrooms.

7.3.2 The Misuse of Mobile Devices

There is an overlapping and complex relationship between the misuse of ubiquitous devices and conservative factors in Saudi society, as both are connected to Saudi social

norms, and both have been influencing each other to discourage teachers from using m-learning inside classrooms. As discussed in the previous section, students may misuse mobile devices by taking unwanted photographs or videos of their teachers or their lessons and uploading them to social media websites. These may involve things such as students shouting, talking with their mobile phones in class, or mocking the lesson. In addition, students could film teachers, modify their images on Photoshop, and then disseminate unreal images that harm the teacher. Or students may share rumours and unreal information about their teachers or other students just for their amusement. This issue is known as 'Cyber Bullying Teachers' – and is a form of online bullying, which the National Crime Prevention Council (2010) defines as "the use of the Internet, cell phones, or other devices to send or post text or images intended to hurt or embarrass another person" (para. 2). This phenomenon has been discussed widely in previous studies (Baker et al., 2012; Engel and Green, 2011; Minor et al., 2013; Obringer and Coffey, 2007; Sellers et al., 2013), which all looked at bullying by students in secondary and postsecondary education. At this stage of their educations, students are often unaware of the consequences of what they share online. Such an issue could obviously deter educators from choosing to use portable devices inside classrooms, however.

In relation to the social dimension, 44% of worldwide keek users are from Saudi Arabia, and actively participate in watching and uploading social videos on this platform (Al-Shehri, 2012). Although most of its content is comprised of personal or social-based videos, some Saudi tweeters and authors claim that keek is misused by a number of young Saudi users, who film publish anything they film by smartphone without any responsibility concerning what they publish (Aleqtisadiah Online Journal, 2013). On the positive side, the popularity of this app would enable instructors to engage young Saudis with it inside the educational context. However, a code-of-conduct policy would need to be provided by the university as a solution to addresses the issue of cyber bullying and the general misuse of the app (Minor et al., 2013).

The most commonly cited student misuse of smartphones is the distraction that such devices can cause in the classroom, particularly in relation to students using their smartphones when they should be paying attention to lectures. Several studies report this problem (Gavin and Knight, 2012; Gill et al., 2012; Katz-Sidlow et al., 2012;

Wallace et al., 2012). In addition, students can easily distract other students by using their phones during teacher and student interactions, which can prevent teachers from wanting to allow students to use mobile devices inside their classrooms. Nevertheless, instead of perceiving portable devices as potential disturbances, instructors should exploit the advanced digital tools that students already have in their pockets, and discover effective ways to integrate them for the assistance of learning (Sharples, 2003).

Students, as noted earlier, are often strongly attached to their mobile devices, and incorporating this technology within classrooms could make their learning environments more enjoyable for them. Notably, students' views differed substantially from faculty members' views on the above issues, with many students observing that portable devices are more appropriate for learning than teachers consider them to be, and also that they are less disrupting than teachers view them to be (Baker et al., 2012). However, the students need to be made aware of the problems for integrating portable devices, and the lecturers need to control the process of mobile technology integration by making clear rules about what is allowed and what is not in order to prevent such devices from causing distractions. Baker et al. (2012) recommended the enactment of 'an electronic device usage policy' in mobile learning environments in order to inform educators how to prevent disruptions (p.285). Cook and Santos (2016) contend that this dynamic internet-digital tool, when combined with enabled-social networks, is exaggeratedly labelled as a 'weapon of mass distraction', but could in fact have the potential power to develop learning and attract learners. For example, social media such as Facebook could support students with 'lower self-esteem' to reduce the obstacles in forming heterogeneous trust networks, providing a social capital resource (Cook et al., 2012). However, the researchers called for further research to ensure the sustainability, scalability and equity of access to such media and devices to explore the potential of creating social capital in this way.

Another worry about possible misuse raised by the research participants in this study was the use of teachers' phone numbers by students (e.g. calling or texting them during their personal time). A number of faculty members who planned to use or already used WhatsApp were concerned about this, as this involves the teachers' mobile phone number being made available to all the students that use the app. However, the use of

mobile learning itself does not require the teacher to share their phone number, and there are plenty of mobile applications and systems that can be downloaded and used in educational settings that do not require educators to give out such details. These faculty members thus feared that m-learning could lead to communication between them and their students via mobile devices for non-learning purposes, such as for attendance and absence issues, grading and sending announcements, but this need not be the case.

It is clear that perceived student misuses of mobile devices are related to cultural factors, and many faculty members seemed to hold the thought that if students misuse mobile devices at social gatherings and outside the campus environment, they will inevitably misuse them on campus as well. The informants also stated that this is the reason why social norms have no relationship with other factors – social norms concern general behaviour, whereas the other factors in this research are related to the technology directly. Hence, it is clear why there are strong positive correlations between the other factors.

It is the role of both the faculty and the university administration to educate students and draw their attentions to the security criteria and principles for mobile device usage (Markelj & Bernick, 2012). In addition, educators and universities should ensure that students are aware of ethical considerations in relation to the data that is used and stored on their devices, such as the images and videos that are collected by learners while using smartphones and tablets for learning (Wishart, 2009). They should also ensure that students understand the consequences of misusing mobile devices both inside and outside the university's borders.

7.3.3 The Privacy of Women in Saudi Society

The interview findings revealed that both genders had similar insights about the issues that mobile devices present for the female university community. The privacy of women was considered to be a common problem, and was generalised to all Arab countries (for more detail, see Baki, 2004). This issue impacts not only upon education, but also on several arenas relating to women's roles and lives within the public sphere in these countries. In addition, informants repeatedly commented that

there are several social factors within the Saudi community that lead to particular problems regarding the privacy of women.

The bases of these attitudes may largely be traced to old Saudi stereotypes, which have, to some extent, influenced both male and female perceptions alike. Over the past twenty-five years, women in Saudi society have come to be stereotyped as ‘glass houses’, which will shatter if any technology enters them. This has led to the belief that it is best to ban women from using such technology under the pretext that it safeguards their ‘privacy’. This has contributed to women's technological illiteracy over the years, and this illiteracy has, in turn, had a negative affect on the presence and opportunities of women within the community.

However, some respondents expressed the view that the issue of the privacy of women is one that is, to some degree, media-created. It receives a huge focus in the media – greater than the importance it had before they focused in on it. It is thus a cultural issue that has been brought into Saudi cultural practice more and more over recent years, and some contend that it does not deserve the attention it now receives.

7.3.4 Lack of Knowledge

One of the main factors that hinder the faculty in adopting and using m-learning is their lack of adequate knowledge and awareness about how to use it within their professional practice, either inside or outside the campus. This knowledge could be obtained through the provision of a number of training courses that help teachers to become aware of and familiar with the potential uses of portable devices for teaching and learning. The faculty members need to also develop their understanding of the possible benefits of using this technology in order to help them improve their academic teaching and to facilitate their students’ learning experiences. In addition, they must be supported with the necessary information concerning how m-learning can be integrated into their teaching, and what the important applications used in each specialty are, taking into account all the potential barriers that have been presented in this study to ensure that such interventions are successful. The training sessions should involve other effective m-learning interventions, and engage with how they could potentially raise the performance of both professors and students alike. Despite the

existence of the University Development Department in KAU, most of the courses it provides are electronic and distance learning ones.

The faculty members' desires for m-learning training courses coincide with the remarkable development that they view the university student as having undergone. Many students now already use smartphones to search for information inside classrooms regardless of whether their teachers have the knowledge to use m-learning. Although some students and parents are not willing to blend m-learning with traditional learning, most students are keen to learn to use their mobile devices, and for their educators to provide mobile learning environments that contain their curriculums, homework, and the times of their tests.

7.3.5 The Lack of Resources

In addition to the lack of knowledge that Saudi HE educators have about m-learning, a lack of sufficient resources supporting their use of it is also an issue. Such resources could include access to mobile devices for both instructors and students, and the provision of high-quality infrastructure, including internet and Wi-Fi connections both inside and outside the university. However, a supply of resources is not in-itself sufficient for the successful deployment of m-learning, as educators and designers also need to explore how these resources can be best utilised to support teaching and learning (Naismith et al., 2004). Nonetheless, there is currently a lack of awareness in Saudi higher education about what the capabilities of mobile devices are, and what digital mobile applications are available for didactic use, which could negatively impact on faculty members' willingness to adopt m-learning (Futurelab et al., 2004).

Several issues regarding the provision of resources arose during this research, one of which was that not all students and teachers have new, branded portable devices, with a small percentage of both still owning old-fashioned cell phones. In relation to the instructors, those not owning advanced mobile devices were from the 50 years and over age group, and they did not perceive new mobile devices as being user-friendly. Moreover, some faculty members had concerns about using their mobile devices for m-learning in terms of how it would impact on the efficiency and usability of their digital phones – i.e. they were worried that mobile learning apps and data would take up a large amount of their storage capacity. In addition to limited storage, screen size

and battery life are also practical concerns that teachers had about device capabilities when considering whether to use them for m-learning.

Moreover, some students still do not have smartphones and/or internet connected mobile devices (Al-Fahad, 2009; Al-Shehri, 2013). This may be due to a number of factors, including high costs of living, family responsibilities for both male and female students, or low interest in technological innovations. Policy makers in universities and cell phone companies should take these factors into account, and could offer students loans to increase smartphone ownership, for instance. In addition, basic and advanced training courses should be provided for faculty members who are resistant to using advanced cell phones in order to increase their technological confidence and to enhance their mobile technology literacy. These could be valuable steps towards the successful and effective adoption of m-learning.

Furthermore, using advanced cell phones in universities that do not provide sufficient internet networks would limit and impair the experience of m-learning for both students and teachers. It was recognised that the increase of web-enabled phones in cosmopolitan universities (in this study, in King Abdulaziz University in Jeddah – the second biggest city in Saudi Arabia) leads to increasing educator adoption of these tools, as they are already "an ever-present fixture" in the students' lives (McConatha et al., 2008). Wagner and Wilson (2005) stated that "the adoption of next generation WiFi and MAN/WAN cellular networks will continue to deliver on the promise of 'anywhere, anytime' access" (p. 43). Although there is good infrastructure in King Abdulaziz University – which has a large number of PC laboratories and high-quality internet and Wi-Fi networks – these facilities are only available with high-speed networks within certain faculties, such as Medicine, Engineering, and Computer Science, whereas other faculties, such as Arts and Humanities and the Business School, lack both IT labs and broadband connections. The lack of proper infrastructure and Wi-Fi coverage inside campuses are the main obstacles that prevent educators from adopting m-learning on university campuses. This issue also concerns faculty members who are currently using m-learning inside their classrooms, as they are often forced to rely on mobile connections instead of university networks. In addition, although the students have access to Wi-Fi networks inside the university campus, they have limited access to certain websites, such as YouTube. Thus, many students

prefer to access the web through their mobile devices. Mobile internet-enabled devices are a good solution to the lack of university IT and internet networking systems (Almarwani, 2011). However, official use of m-learning with a lack of Wi-Fi coverage could be problematic though, as students would be required to use 3G, so this would cost them.

Another concern regarding the availability of resources is the lack of instructional mobile applications that exist. University administrations and educators need to understand the potential benefits and prospects that m-learning has in terms of its applications to aid in the delivery of educational content and to enhance pedagogical methods. It is worth mentioning here that King Abdulaziz University has its own MyKAU mobile application, which provides all the university stakeholders with anywhere/anytime access to the university portal and website through portable devices. It also offers several shared electronic services for both academic staff and students, such as course schedules, student information, system alerts, communication with teachers, support and communication, news and a university map, as well as some services that are just for the faculty, such as access to research and the Marz system (a system through which every faculty member can build and manage his/her own website).

However, these services are more concerned with facilitating educators' and students' administrative needs, and less with targeting the didactic process and the development of learning and teaching. In addition, the university does not have a programming team for designing and creating instructional mobile applications to help educators who are using m-learning and that need these apps. There is, however, a Centre for Teaching & Learning Development in KAU, which provides workshops for training instructors and students alike that offer knowledge and skills development programmes which help participants to perform their roles effectively, thus developing the educational process (KAU, 2011). This centre concentrates on training faculty members and keeping them up-to-date with the rapid informational and technological changes that occur so that they can explore their potential, effectiveness and excellence in promoting the educational process in order to improve and develop their educational and research performance for the benefit of both students and the university community (ibid). However, there are no training courses that deal with the use of

mobile devices for teaching and learning, nor with the use of mobile applications, nor with how to programme educational apps.

On the other hand, it would be difficult for universities to design numerous mobile applications to serve different subjects, and here the phrase 'give a man a fish and you feed him for a day; teach a man to fish and you feed him for a lifetime' is appropriate (Anne Isabella Ritchie, 1890). That is, educators need to be provided with workshops on programming mobile applications that provide them with basic knowledge, programming experience and easy to use tools (e.g. app press software for IOS and Android mobile systems) for producing their own apps, based on their preferred language – Arabic or English. This is required because the efficiency of current mobile applications for learners is uncertain, given that the content of apps and the ways of delivering the contents are linked to the educators (Jumaata and Tasir, 2013). Also, such training would enrich instructional digital content and support the creation of effective mobile learning environments (Koole, 2009). Furthermore, educators who become experienced in programming can pass these skills on to their students, who can then, in turn, become experts in designing and generating mobile applications. The students will then not just be consumers, but also content designers and producers who are capable of contributing to the Twenty-First Century global economy as a result of the increasing trend of using mobile programming applications (UNESCO, 2013). In addition, it was evident that the mass media facilitates a paradigm-shift in user-generated content through learning using mobile devices (Cook et al., 2012).

It should be noted, however, that the curriculums in some fields are difficult to implement through mobile learning techniques, as the applications on mobile technologies lack the functionality and consistency of those on desktop or laptop computers. Examples of these include Flash Reader, Java Plugs, Microsoft Word and PPT. These types of files cannot be edited, and viewing them on a tiny screen always changes the format, especially when there are tables, figures or any non-textual content. There are also concerns that reading or studying on relatively small screens could eventually harm people's eyes, and thus that these screens do not provide good visual study mediums.

The m-learning environment has the unique feature of anywhere/anytime learning that can be used by both learners and educators (Sharples et al., 2002). Broadband services are not only available in university campuses and, if m-learning were to be adopted, instructors and students could access information and learning materials via mobile devices at any place and time. Zhao and Frank (2003) highlight how the lack of access to internet at home represents a central obstacle to using technology in the educational process. It is worth mentioning that the demand for home internet networks has recently boomed considerably in Saudi Arabia, in line with the society's desire for broadband services, particularly after the Saudi government funded many tech schemes that required the construction and enhancement of digital infrastructure to make all its services electronic. Many government and banking services are now accessed through e-government transactions and, as such, many people are downloading applications to smart devices to use these services – the main apps here being 'Tadawul' (the stock exchange system) and 'Absher' (e-services of Ministry of Interior). Given the increasing demand for such mobile applications, it is possible that instructional mobile applications may also become popular in the near future.

Although Saudi Arabia is experiencing a tremendous transformation of and uptake in internet services, with higher connection speeds being available for connected devices (Al-Mubarak, 2013), the cost of these services is still relatively high. In addition, although internet suppliers are touting high-speed and high-quality connections for all users, internet connections on mobile phones are often quite poor, being slow and sometimes unavailable, specifically in rural areas (ibid). The widespread use of the internet in the Saudi society is another factor that should encourage the growth of utilising smartphones in teaching and learning, but effective infrastructure must be available in order to ensure its successful deployment. A key requirement for the effective implementation of m-learning is community support in the form of public finance and guidelines for m-learning, training in the use of technology, and digital content development (UNISCO, 2012). The necessary resources – including mobile devices equipped with internet connections – must also be affordable for students and educators in order for them to successfully use m-learning and to fully exploit this technology in their professional practices in the near future. Also, the existence of apps that serve different subjects with different languages might help speed up and advance

teachers' m-learning readiness and change their traditional practices, which are considered one of the major obstacles to the adoption of m-learning.

7.3.6 Technical Support Team

The existence of support teams to help university teachers solve any problems that may occur during the deployment of mobile learning is essential for its effective use (Futurelab et al., 2004). King Abdulaziz University has a Deanship of Information Technology, which is responsible for building a cooperative educational community that improves the University's technical, administrative and instructional standards by providing the latest software, services, consultancies and technical studies for its educational, cultural, research and administrative sectors and, more importantly, for providing technical support across all the institution's departments. However, the findings of this research indicated that there are no technical support groups within the IT department that are specific for mobile learning environments (KAU, 2012). That is because m-learning is not officially deployed in the university, and thus most educators and administrators lack awareness both about what it is, and how it could be effectively integrated to help students learn. Nevertheless, if the m-learning culture were to be disseminated across the campus, and both educators and students utilised these ubiquitous devices in educational practice, the IT department would be more than happy to provide a technical team to support them in m-learning settings.

In addition, the Deanship of E-learning and Distance Education in KAU is holding courses to train faculty members and students how to use the learning management system, Blackboard, and other online sources and software (e.g. electronic examination systems, electronic curriculum instructional design systems, and to record lectures using the programme *Camtasia*). This involves a blend of online learning with traditional face-to-face learning for supplemental purposes, such as assignment submissions, group projects, content sharing, and discussions (KAU, 2015). However, replacing the blended mode of learning with partial or full online learning is not a strategy that is accepted or supported by the university. As the interest of the current thesis focuses on hybrid-learning that utilises m-learning within the face-to-face teaching and learning mode, there seem to be good reasons for the university to supply the faculty and students with courses on how the technology could be used and what the benefits are for such integration. However, there are no such courses with

regards to blending the use of mobile devices within face-to-face teaching and learning, nor any real interventions on m-learning.

In addition, the availability of a maintenance team is important to support m-learning, as most educators at King Abdulaziz are not mobile technology specialists. Moreover, having technical support specialists available to solve problems throughout the university term would help to shorten the time that instructors would need to spend preparing and delivering m-learning.

7.3.7 University Encouragement

The lack of university encouragement is another factor that influences faculty members' adoption of m-learning. Akour (2009) highlighted the significance that institutional commitment has for encouraging m-learning in higher education. University encouragement would include things such as providing expert programming teams to help in developing Arabic digital content and transforming curriculums into a digital format by designing and programming apps that relate to educators' disciplines so that their students can enjoy using their mobile devices more than traditional textbooks. In addition, because m-learning is voluntary, university encouragement should take a financial form, which it could do by providing a financial reward to teachers who are motivated to use m-learning in their teaching practice.

On the other hand, as the university makes the use of its other electronic administrational systems such as Anjez (administrational services) and Marz compulsory, it should also encourage and make compulsory the use of m-learning by all teachers, as well as letting students evaluate teachers' achievements at the end of each semester. Such encouragement could be achieved through giving faculty members more freedom concerning how to present the learning curriculum, crediting faculty members' efforts in using mobile learning, reducing the burden of teaching, and giving rewards to those who use m-learning.

7.3.8 Faculty and Student Trialability Availability

Trialability is an important factor for achieving acceptance for any technology that is (or can be) used in teaching. In this study, trialability was found to be one of the three most influential factors affecting faculty adoption of m-learning, and it is crucial to

understand the reasons for this. The motivation of lecturers to try new modes of learning (such as m-learning) is grounded in a broader motivation and disposition to innovate. As people do not learn passively, the experiences of both teachers and students must be taken into account. An internal desire to practise m-learning leads to the person's resolve to try it, regardless of whether there are conditions that support and encourage it. As educators need to know the benefits of m-learning, they also need to exercise some activities via their smartphones or tablets before they begin to learn it (Knowles, 1998). They should be given freedom to experience this new method of learning through trial and error before they use it in their teaching practice, as this could decrease the level of user anxiety about using it with their students, otherwise its adoption will meet greater resistance (Joo et al., 2014).

In addition, the existence of good support – such as knowledge and resources – could encourage teachers to try new teaching methods and break with their habitual routines. Moreover, the educators cannot adopt m-learning if their skills in using mobile devices are weak, as they do not want to devote significant amounts of time to trying to use something that they are not already familiar with. Furthermore, serious motivation on developing m-learning is required from both the faculty and the students if Saudi universities are to keep up with educational systems in developed countries. As Saudi students are willing and able to try out new methods of learning using their mobile devices, the faculty members need to take a step forward in attempting to use m-learning. However, academic staff are still aware of the potential for mobile devices to be misused and, in order to address this concern, it is important to consider how mobile devices would best be used in education and how potential harms could be minimised.

7.3.9 Teachers' Resistance to Change

Different insights about resistance to change included that the impact of social norms extends to the teaching undertaken in schools, colleges, universities, and even at home, with students and teachers getting used to one way of teaching – "paper & pin" – that leads both teachers and students to uncertainty concerning whether alternatives provide appropriate methods for teaching and learning. Students and parents may sometimes see portable electronic devices as forms of entertainment, casting doubts

on their suitability for learning, leading to teachers resisting implementing and blending m-learning within education.

Mobile learning shouldn't be used to replace formal education, but it can extend learning beyond the traditional classroom. As a result of the global demand for (and adoption of) mobile devices, instruction in learning environments must change from an "I teach" to a "we learn" pedagogy in which the instructor learns alongside the students (Norris & Soloway, 2011). It is important for educators to be open to the use of mobile technology and to consider and explore how to transform learning in the mobile age rather than to perceive the rapid adoption of mobile technology as a threat to traditional forms of learning. Such technology opens numerous doors for learning, enabling it to occur not just from instructor to student, but from student to student as well, and this alters the teacher's role from a holder and disseminator of information to a 'director of learning' (Norris & Soloway, 2011).

In addition, learning is limited to textbooks across many faculties in the university. Singleton et al. (2004), found that lecturers favour traditional teaching environments over the adoption of technological approaches because of their familiarity with established norms. Therefore, educators' resistance to change inhibits the integration of mobile technology into the learning process. Moreover, using mobile devices for teaching and learning is perceived to be a time-consuming process, requiring significant effort. This view was particularly common amongst the educators in this study from the over 50 age group, who showed an aversion to using modern technology in learning on the grounds that it requires skills that they don't have; takes too much time to learn; and is unnecessary in any case, as the classical teaching method is still effective.

In addition to a lack of motivation and willingness to use m-learning providing an obstacle for its adoption, teachers' experiences, behaviours and cognitive factors also shape their beliefs about their abilities to accomplish tasks, and some individuals might thus avoid learning new things because of the difficulties and risks that they perceive to be linked to achieving these tasks (Porter and Donthu, 2006). Hence, it is the university's role to provide greater encouragement on using mobile technology for teaching and learning, and to try to direct faculty members' attentions towards the

benefits of integrating the use of this technology with their other teaching methods by offering them both training courses and financial incentives.

7.3.10 Skills in Using Mobile Devices

It is very important for faculty members to have the requisite skills for the effective adoption of m-learning in their teaching. However, not all educators need to have the same level of skills, as some disciplines involve more simple face-to-face modes of teaching, whereas others require teachers to have more advanced technological skills. For example, in religious studies, faculty members need to use more oral explanations than technological methods as a medium for communication, whereas in medicine, the faculty sometimes need to use technology to facilitate teaching. However, most Saudi HE teachers lack the required skills in m-learning because of their 'nescience' of the benefits of m-learning in general. In the previous decade in Saudi Arabia, many faculty members resisted using PCs and the internet, but then raced to adopt them when they came to understand their benefits and usefulness. Zhao and Frank (2003) point out that instructors' positive perceptions about the use of IT sped up its adoption in learning. Moreover, everyone who owns a technological skill is psychologically motivated to that technology and skill in all the relevant aspects of their lives to which they it can be applied, including in education. However, if they have a low skill level in using technology in teaching and learning, then that will prevent them from using it and encourage them to return to traditional teaching methods. The best solution for addressing the lack of m-learning skills is thus to provide training courses for university teachers so that they can develop and enhance their mobile usage skills.

Moreover, although students are digital natives, some of them also need to learn the technical skills to use mobile devices in learning, and students who do not own mobile devices may be less skilled in using m-learning than their counterparts who do own them. Once more, it is important to ensure that mobile devices that are adequate for use in m-learning can be purchased for affordable prices and that multiple programmes are provided on different systems for both students and educators before m-learning commences.

7.3.11 M-learning Anxiety

Faculty members' feelings of discomfort and fears about coping with mobile devices were considered to be important concerns that need addressing before m-learning can be successfully adopted in HE teaching and learning in Saudi Arabia. An 'anxiety' factor was frequently cited in the interview phase. Although most faculty members did not present any type of anxiety when using m-learning, this issue was nonetheless raised. Some lecturers felt threatened and overwhelmed when using technology in classrooms because of their lack of technological skills, and they perceived students to have greater tech expertise than them. Hence, the teachers may have felt anxiety about not using mobile devices properly, and about making errors while using them. Thus, sufficient trial activities are necessary, and need to be undertaken before m-learning is used, so that their mobile learning experiences can address this concern.

In addition, anxiety issues may involve the 'socio-cultural fit' of mobile learning content within different national contexts (UNESCO, 2012). Mobile learning material taken from different cultural regions may not suit the Saudi learning setting. For example, teachers who teach English as a second language may use native English videos apps so that students can recognise the fluency and perfection of their accents, and compare them with those of their teachers. This could lead teachers to experience personal anxiety and embarrassment (Ayala Foundation, 2011). On the other hand, educators could improve their professional performances by viewing mobile learning materials before the start of the lesson and practising their accents (ibid). The negative outcomes here could be avoided, however, if the mobile applications that were used were developed locally.

7.3.12 Ownership

The ownership of mobile devices by students and teachers was cited by respondents as significantly influencing their adoption of m-learning, and economic factors and standards of living for both students and teachers need to be further investigated. Unexpectedly, this concern was mentioned broadly in the interviews, as well as in the open-ended question in the survey phase. Evidence from the body of literature demonstrated the impact of this consideration for both students and teachers (Kukulska-Hulme et al., 2009; Laurillard, 2007; Sharples et al., 2005; Traxler, 2007; UNESCO, 2012; Wishart, 2009). From the students' point of view, the cost of mobile

devices can be prohibitive, and using m-learning could thus lead to inequities between students. The acquisition of a mobile device with a high price value may thus be a significant barrier to the adoption of m-learning in higher educational settings.

According to a UNESCO report in 2012, the primary enablers for mobile learning are widespread mobile phone ownership and familiarity with mobile devices. Although mobile phones will have a penetration rate of 169.3% in Saudi Arabia by the end of 2014, the respondents expressed their doubts about student ownership in universities (CITC, 2015). Moreover, some teachers still own old cellular phones, and find it difficult to change to smartphones because they are not familiar with new technology. However, the data collected from the interviews slightly contradicted the data from the survey, which indicated that a large majority of the participants 97.8% reported having a smart mobile device with high functionality (for example, iPhones, Android phones, iPads, Galaxy Tablets, and laptops).

Taking all the views into account, initiating an m-learning scheme in higher education could be successful so long as both students and teachers use their own mobile equipment to contribute in instructional tasks and training sessions (UNESCO, 2012). However, the lack of universal mobile device ownership may present inequities. Here, it is the role of university administrations to provide or ensure universal access to mobile devices for learning in order to address the issue of fairness among students. However, personalisation of the information in mobile devices is a key aspect here (Akour, 2009), especially for addressing privacy issues that may rise if mobile devices were shared amongst students. M-learning would be more flexible and provide easier access to educational materials if students all used their own smartphones (Caudill, 2007). With respect to the global ownership of mobile devices, projects like BYOD (Bring Your Own Device) – which was widely accepted and utilised in US and UK (Armando et al., 2013; Ballagas, et al., 2004; Morrow, 2012; Raths, 2012) – could be effective and successful if deployed in Saudi higher education, as Clark and Luckin (2013) conclude that the use of iPads has the potential to increase learners' enthusiasm, creativity, motivation, and self-regulation. However, its potential challenges must be considered in order to assure its successful deployment.

Balancing mobile device availability and actual use of m-learning in Saudi higher education is thus a crucial priority for universities there. King Abdulaziz University already has a laptop loan scheme, and should thus look into providing a mobile device loan scheme as well. This would achieve equity among students and ensure that the deployment of m-learning did not unfairly disadvantage any students. One common factor cited as being required for m-learning to be successfully implemented in Saudi higher education was that financial support should be provided by governments and educational institutions in order to ensure that students could access mobile devices, as well as to provide the required tools to set up m-learning schemes in Saudi universities.

7.4 The Future Use of M-learning by University Teachers in Saudi Arabia

Teachers' views about the future use of m-learning seemed to be optimistic. They suggested that academic teaching staff would be willing to adopt m-learning in the future if they knew how to successfully integrate the necessary technology into their educational settings. There were a number of positive and negative factors that were seen as having an impact on its implementation, and which accompanied their expectance that it would increasingly be used in the future. The positive views regarding the adoption of m-learning were that that it had the potential to enhance the quality of Saudi higher education, to enhance the quality of learning content, to improve faculty teaching practices, to enable teachers to follow and reach a large number of students, and to make the learning process more enjoyable for both teachers and students.

One encouraging factor was seen in the view that Saudi universities should design and manage the process of integrating mobile technology in learning to avoid the degree of randomness and confusion in its early use, and the suggestion that universities' administrations should play a greater role in disseminating m-learning, organising its deployment, and drawing faculty members' attentions to the importance of its use. Al-Shehri (2012), a Saudi author, questioned whether the initiative of adopting m-learning in higher education in Saudi Arabia would be more effectively achieved through a 'top-down' or 'bottom-up' approach. It also needs to be considered whether

the managements in Saudi universities are ready for such a method of learning, and whether learners should use their smartphones in the learning process. With respect to the idea of 'top-down' initiation, university communities would have to consider the financial implications for both teachers and students before m-learning could be introduced, as already argued.

With regards to teachers, several issues need considering. First of all, universities would need to ensure that teachers are ready for using m-learning, and then comprehensive training courses would need to be provided to improve their skills in using mobile devices for teaching and learning. In addition, all the proposed factors in this research – performance expectancy, effort expectancy, social influence, facilitating conditions, perceived trialability, perceived social norms, and resistance to change – must be taken into account before any real implementations are made. Another evaluation of how m-learning could be developed in the future would involve accessing Arabic digital content through the development of Arabic apps for Saudi lecturers who are not fluent in English. According to a UNESCO report (2013), learners will not only be able to access information via their mobile devices within the following decade, but will also learn to develop apps individually to meet their desires. This could stretch students' programming skills, enabling them to become involved in commercial settings through integrating mobile software designing with official learning across several subjects. Moreover, opportunities may arise for mobile programming bodies and instructional developers to design Arabic apps that suit Saudi university curriculums which, in turn, could encourage the integration of m-learning in higher education in the near future.

On the other hand, if students' were responsible for pushing the adoption of m-learning, other issues could arise. In addition to the consideration that not all of these students would be able to afford mobile devices, not all learners have enough awareness of how to use their mobile devices for learning purposes (Seliaman and Al-Turki, 2012) or how mobile devices could effectively facilitate their learning (Chanchary and Islam, 2011).

However, at the higher educational level, lecturers should bear the main responsibility for facilitating the learning process and delivering their course through engaging

techniques (Baker et al., 2012). They should take the helm of the ship and steer the students into a knowledge marina using attractive contemporary methods of learning to enrich the educational experiences and create memorable moments of learning. As a number of different methods for using mobile devices in higher education are being developed (Wishart and Green, 2010), Saudi universities still have some concerns about the use of smartphones, tablets and camera phones by both educators and learners. Nonetheless, in the following decade, mobile technology will become a key part of learning in higher education, and will be incorporated both formally and informally as a mandatory educational routine (UNESCO, 2013). It is considered to be a good fit for Twenty-first Century learners who are searching for, creating and transferring knowledge. Hence, Saudi universities and teachers must be prepared for these world trends in order to keep pace with promising future learning models. These facts indicate that the future of mobile learning in Saudi Arabia is promising, and that more mobile learning opportunities are expected to be presented.

7.5 Conclusion

This chapter discussed the qualitative findings, which suggest that m-learning is an instructional tool that is highly valued and preferred by some teachers to the use of traditional methods of teaching, and which seems to have a promising future if certain conditions can be met. Meeting these conditions means addressing the factors presented in this chapter that inhibit m-learning and deter faculty members from being willing to adopt and use it. These factors have social, cultural, pedagogical, technical, attitudinal and behavioural dimensions. In addition, some attributes that could promote the adoption of m-learning were discovered. Encouragement factors were related to educators' motivations to use m-learning, their beliefs in the benefits of m-learning for developing Saudi higher education and for their students, and the enjoyment factor of using it. All these aspects were imperative for encouraging university teachers' acceptance of m-learning. The following chapter presents a summary of the whole study, answers the research questions, considers the implications of the study, and addresses some of its limitations.

Chapter 8 : Conclusion

Mobile learning has been widely and internationally adopted by higher education institutions, yet remains largely underutilised in Arab nations. As stated earlier, a significant amount of research examining students' acceptance and use of m-learning within higher education has been conducted in this region, and has found that students are enthusiastic about the idea of using their smartphones and tablets as a medium for learning and communication, both formally and informally, and both inside and outside classrooms. However, mobile learning initiatives face a number of barriers in universities in Arab nations, one of which is a lack of educator willingness to adopt and utilise mobile devices in the learning and teaching process. This barrier was also found by the current study.

The purpose of this thesis was to investigate Saudi faculty members' perceptions about using mobile devices for learning and teaching, and it did so by exploring factors with the potential to encourage or inhibit their use of such devices within higher education. The main factors that were explored were ones based on UTAUT, IDT, and the two extended constructs.

Both the quantitative and qualitative methods of data analysis were used to address the research questions (see §1.3). The results of the Likert-style survey responses provide preliminary answers to these questions. Moreover, in line with the strategy outlined in the research methodology chapter, the results of the survey were used to inform the interview questions. Open-ended questions and interviews assisted in developing depth and breadth to the quantitative data, and provide detailed information about faculty members' attitudes and perceptions about the use of mobiles devices and m-learning.

First and foremost, it was theorised that social norms would have a significant negative influence on Saudi faculty members' intentions to use m-learning in their teaching practices, and that gender would be a moderator of faculty members' adoption of m-learning. This research found that the adoption and use of m-learning in higher education can be predicted from faculty members' behavioural intentions to use m-

learning in their current and future teaching and learning practice which is, in turn, significantly affected by performance expectancy, effort expectancy, social influence, facilitating conditions, perceived trialability, social norms, and resistance to change. Among these variables, social norms was the most significant determinant, having a direct affect on educators' behavioural intentions to use m-learning. The next two most significant determinants were facilitating conditions and perceived trialability, but gender was found to play no significant role in intentions to use m-learning. The study aimed to answer four research questions, which are presented and discussed below. The previous two chapters (the Discussion Chapters) provided a broad summary of the findings of this research, and this chapter adds to this by considering the implications and limitations of this research, as well as by making recommendations.

8.1 Research Summary

8.1.1 The Main Research Question

How do Saudi social norms influence the adoption of mobile learning by faculty members in Saudi higher education, and is gender an important factor for its uptake within this constituency?

The quantitative findings revealed that social norms have a significant and negative effect on faculty members' perceptions about the use of mobile learning. It is therefore accepted that an individual that is strongly affected by Saudi social norms is less likely to adopt m-learning than an individual who is less affected by them. However, Saudi social norms show no statistically significant difference in terms of their impact on the use of mobile learning between males and females. Social norms were the most significant predictors of intentions to use m-learning out of all the factors examined in the research model. Thus, the alternative hypothesis on gender was accepted.

As stated earlier, although there is a broad body of research studying the impact of social influences and cultures on m-learning in relation to both students and teachers, there is no extant research that examines the influence of social norms and traditions on faculty acceptance of mobile learning technology within Arab higher education settings. Therefore, this thesis is pioneering in terms of providing information on the impact of social norms on users' intentions to adopt mobile learning in these settings.

The sequential quantitative-qualitative mixed methods approach used in this study enabled the impact of Arab social norms on the integration of mobile learning in higher educational contexts to be broadly analysed. The first data collected from the survey showed the significance of different social norms, then the interviews revealed the reasons for these impacts. In addition, mobile devices affect numerous aspects of individual lives, including in educational environments, organisations and social settings. People's perceptions of m-learning are influenced both directly and indirectly by the surrounding social culture and norms, and may vary based on people's ranges of beliefs, differences in culture, and the areas in which they live, and these different factors are thus all connected to the adoption of m-learning.

Saudi teachers were found to have a number of concerns about using mobile devices in their teaching practices, including their misuse by students in class, the use of mobile devices equipped with cameras, and the issue of their impact on the 'privacy of women' in Saudi society. These concerns prevented some educators from adopting m-learning and accruing the benefits it offers. However, others were willing to use new teaching methods utilising mobile devices, and were not dissuaded by these societal and cultural barriers.

The data analysis chapter revealed a major qualitative finding, which is that the existence of the camera feature on mobile phones was viewed as the main concern for adopting m-learning in Saudi higher education institutions. The reason for this concern is a lack of awareness among students and educators regarding photographing, publishing, and copyrighting digital content. Several scenarios were also provided in the discussion chapter regarding the connection between conservative Saudi viewpoints, women's privacy, and students' misuse of portable electronic devices.

The research respondents viewed the issue of women's privacy to impact on several aspects of women's lives in nearly all Arab countries, but this impact varies according to individual beliefs and geographical locations. For example, those who live in Western Saudi Arabia have much more liberal views on women's privacy and are more open to discussing this issue than those who live in Central or Southern Saudi Arabia. Women's privacy is a contentious issue in Saudi Arabia, Gulf countries,

Yemen and Pakistan, and it receives more focus and discussion in the media in these countries than it does in Jordan and Egypt.

As the chapter 7 revealed, the possible student misuses of mobile devices that discouraged educators from adopting m-learning included the 'cyber bullying' of teachers, the distractions they can cause, and the misuse of teachers' phone numbers by students. However, professors could also gain benefits from using popular mobile apps (e.g. keek) to attract university students. Furthermore, instead of perceiving portable devices as potential sources of disturbances, instructors should exploit this new trend in learning methods and discover the most effective ways of blending them into their teaching and learning. University rules and guidelines must also be made clear with regard to the use of mobile devices on campuses, however, and this can be done through issuing 'mobile device usage policies' to address problem cases occurring. This, in turn, could prevent or at least limit the issues concerning social norms, and encourage educators to use m-learning.

With regards to the gender variable, the survey results unexpectedly revealed that male and female faculty members are influenced comparably by social norms to accept or reject the use of m-learning in their current and future teaching practice, which thus led to the acceptance of the null hypothesis. The reasons for the lack of gender differences in the acceptance of m-learning are that, nowadays, both male and female faculty members are much more aware of the skills needed for using m-learning, as well as the attributes, benefits and challenges of using portable devices for teaching.

8.1.2 Research Question 1

In what ways are teachers currently using mobile learning with their students inside and outside the classroom? How do teachers perceive the future of mobile learning?

This question was initially answered using the quantitative data analysis to determine how m-learning is currently used and how the faculty members intended to use it in the future. Further investigations were then undertaken to find out how it is actually used, and how faculty members could be encouraged to use or continue using it in the future. First of all, it should be noted that both the faculty members who considered themselves to be practising m-learning and most of those who had never used it

understood the concept of ‘mobile learning’ as the use of mobile devices in the teaching and learning process. Secondly, the participants were divided into two groups based on their intentions to use m-learning currently and in the future. Group 1 comprised the participants that did not use m-learning in their current practice but wanted to use it in the future, and Group 2 comprised the participants who used m-learning in their current practice and wanted to continue using it in the future.

It was found that m-learning was not being fully exploited in the higher education provided at King Abdulaziz University in Jeddah city. In addition, the use of m-learning seemed to be at a very early stage within Saudi higher education in general. The faculty members lacked knowledge about what was available for educational use on mobile devices, either through apps that are developed for learning or via other means for implementing m-learning across different subjects. In spite of this, professors and lecturers were willing to deploy m-learning within their professional practices if they could gain the knowledge of how mobile devices could be used in teaching and learning, and thus were *willing* to increase their teaching capabilities in this way.

On the other hand, m-learning was utilised by some educators through WhatsApp, Facebook, Twitter, and emails as an additional means for teaching and communicating with their students. As apps such as WhatsApp, keek, and Twitter have become increasingly popular among Saudi youths, educators have the opportunity to exploit these apps and utilise them as the bases for a simple m-learning approach which could have positive outcomes and improve performance for both educators and learners. Only a small number of educators believed that mobile devices should *only* be used for social communication and that they are inappropriate for educational practices. These views could plausibly be attributed to lecturers who were frustrated and fed up with students fiddling with their mobile phones during lectures or technophobe lecturers. However, it could also be caused by a lack of resources, knowledge, and university support for using portable devices within the educational context, as faculty members were not fully aware of the potential of m-learning or how to deploy it in their professional practice. Hence, providing professional development training courses could address such beliefs and attitudes.

However, findings regarding educators' willingness to use m-learning in Saudi Arabia generally provided grounds for optimism, with most faculty members expressing a willingness to adopt m-learning in the future provided that certain conditions are met. Firstly, the factors that were identified by this research as inhibiting faculty members' willingness to adopt and use mobile devices in teaching and learning must be successfully addressed. These factors have social, cultural, pedagogical, technical, attitudinal and behavioural dimensions.

In relation to the social and cultural dimensions, the existence of the camera feature on mobile devices was the greatest worry, and was seen as a potentially dangerous aspect for using m-learning in Saudi educational contexts. This issue must thus be addressed before mobile learning applications can be readily accepted. Members of Saudi university society, including educators and students, should be provided with lectures raising and addressing these concerns and on improving awareness about issues such as photographing, publishing, and copyrighting images and videos, as well as on the student misuse examples that were presented previously. Hence, the faculty and the university administration should play an active role in training students on security criteria and principles for mobile device usage (Markelj & Bernick, 2012), on ethical considerations in relation to the data that is used and stored on their devices (Wishart, 2009), and on the consequences of misusing mobile devices. In addition, university rules and guidelines on the use of mobile devices inside the university's walls must be clearly disseminated through setting up a policy for mobile device use and penalties for misuse for both educators and students. The cultures of the individuals, institutions, and communities must be carefully considered when planning any initiation of an m-learning scheme.

From a pedagogical angle, the main future encouragement for academic teachers to use m-learning should come via increasing pedagogical awareness about the benefits of using mobile devices for teaching and learning, and this could be provided through training sessions. The use of WhatsApp and other simple mobile applications as a start-point for an m-learning programme by educators at King Abdulaziz represents a positive step. However, educators should be aware of other available and beneficial m-learning applications if they are to take the most advantage of mobile devices, such as the 'situated learning paradigm' and social participation (Lave et al., 1991),

'cognitive apprenticeship' (Brown et al., 1989), and student-centred approaches (Becker, 1999).

On the other hand, m-learning has the potential to enrich the quality of Saudi higher education, to improve the quality of learning content, to develop faculty teaching practices, to enable teachers to follow a large number of students, to improve teachers' teaching styles, and to move away from traditional classrooms into more enjoyable learning environments. In addition, lecturers should be supported in developing their skill and knowledge in using and engaging with contemporary mobile learning techniques to facilitate the learning process, improve educational experiences and create memorable moments of learning. In addition, the blending of mobile technology inside traditional learning settings may play a key role in improving student learning success.

Moreover, if educators' believed in the 'enjoyment factor' as an attribute of m-learning, this could encourage them to use m-learning with students both inside and outside the classroom. Thus, mobile learning schemes need to consider the enjoyment factor when designing technological instructional systems (Kiili, 2005). In addition, educators' motivations for adopting m-learning in their academic practice are important for promoting their acceptance of it (MacCallum et al., 2014). As teachers become more aware of the benefits of using m-learning and the drawbacks of continuing to practice traditional teaching methods only, they become more willing to use it in the near future. Furthermore, the perceived usefulness and the perceived ease of use of m-learning have a significant effect on faculty members' perceptions about adopting m-learning both currently and in the future.

In relation to the technical dimension of m-learning, it is important for educators to know how to successfully integrate the necessary mobile technology into the higher educational setting. Hence, broad training courses should be delivered to expand instructors' skills in using mobile devices for teaching and learning. Such training would involve the development of Arabic digital content and apps for Saudi lecturers who are not fluent in English, as well as enabling learners to find out how to develop apps independently and to thus stretch their programming skills. Furthermore, mobile programming bodies and instructional developers are needed to design Arabic apps

that suit Saudi university curriculums. Some students would also need to attend training courses, as not all learners have a high enough awareness on how to use their mobile devices effectively for learning purposes. With regards to faculty members who are resistant to using advanced mobile phones, basic and advanced training courses should be provided to increase their technological confidence and to enhance their mobile technology literacy. These could represent valuable steps towards the successful and effective adoption of m-learning.

Moreover, offering adequate access to the internet on mobile devices may perhaps influence users' attitudes towards adopting m-learning. King Abdulaziz University could develop a MyKAU mobile app, for instance, as well as designing educational tools that offer both instructors and students a space to access learning content digitally anywhere/anytime through portable computer devices. As the KAU has a Blackboard system that can only be accessed through PCs or laptops, it could make this system available through an app similar to those that other developed universities worldwide use.

In order to encourage faculty members to adopt m-learning, Saudi universities should design and manage the process of integrating mobile technology within learning, and should also play a greater role in disseminating m-learning, organising its deployment, and drawing faculty members' attentions to the importance of its use. Furthermore, students, colleagues, departments, and the university can all help to create a culture that encourages the use of m-learning. However, there may be further barriers to its adoption, such as non-universal device ownership and a lack of awareness and knowledge about its possible uses and how to use it. Thus, university communities also need to consider the financial implications for both teachers and students before m-learning can be effectively applied in Saudi higher education.

Nonetheless, Saudi universities and teachers must be prepared for these global shifts if they are to keep pace with future learning trends and developments. Deploying m-learning in the near future may itself help to develop the standards and quality of Saudi higher education, as the introduction of mobile devices into the university environment could provide a strong way to enhance students' academic achievements (Morris, 2010). This, in turn, could advance student knowledge and help to develop

skills that fit the needs of the labour market in Saudi Arabia and beyond (Alzu'be, 2012). Addressing the issues that faculty members might face when using m-learning in the future helps to cultivate this bright and modern way of education. Optimistically, mobile technology may become a key part of learning in Saudi and Arab higher education in the next few years.

8.1.3 Research Question 2

Which of the following dependent variables (if any) are significant predictors of the behavioural intention to use mobile learning: performance expectancy, effort expectancy, social influence, facilitating conditions, perceived trialability, Saudi social norms, and resistance to change?

This research reveals that performance expectancy, effort expectancy, social influence, facilitating conditions, perceived trialability, perceived social norms, and resistance to change are all statistically significant, and that they have direct impacts on faculty members' perceptions about using m-learning, both now and in the future. Although all of these factors had a significant influence on behavioural intentions to use mobile learning, social norms, facilitating conditions, and perceived trialability were more likely than the others to influence respondent-preferences relating to the use of m-learning in current and future pedagogical practice, and this was moderated only by respondents' skills in using mobile devices.

8.1.3.1 Perceived social norms

A strong negative relationship was found between perceived social norms and faculty members' behavioural intentions to use m-learning in their current and future teaching practice. A nation's culture is relevant to the technological uptake that occurs there, and mobile learning can be more successfully adopted when a country's social norms and cultural beliefs towards it are better understood and engaged with. As stated earlier in Chapter 7, Saudi teachers' attitudes towards adopting m-learning were negatively influenced by concerns about the misuse of mobile devices by students, their universities' conservative policies or attitudes regarding the presence of cameras in advanced mobile devices, and the issue of women's privacy in Saudi society. If mobile devices were used irresponsibly by university students, Saudi universities could ban

or restrict their use on campuses, which could negatively impact on teachers and students using technologies for learning.

8.1.3.2 Trialability

From the seven independent factors, trialability was the second most significant predictor of lecturers' attitudes towards using m-learning both now and in the future. Trialability has a positive influence on faculty members' behavioural intentions to use m-learning. It is essential that faculty members be provided with the opportunity to try new methods for teaching and learning before m-learning schemes are deployed so that they can familiarise themselves with the technology and methods in advance. An internal desire to practise m-learning is needed for lecturers to be receptive about the benefits of m-learning which, in turn, decreases the level of user anxiety and increases the level of m-learning adoption.

Providing chances for trialability for both educators and students might speed up the diffusion and adoption of m-learning. Moreover, the existence of the four facilitating condition factors (the presence of knowledge, resources, a support team, and university encouragement) would encourage educators to change their habitual routines. In addition, higher education institutions must provide greater support for instructors through delivering training courses that can be taken before m-learning is adopted in order to allow them to become more skilled in using mobile learning applications. All these solutions could potentially speed up educators' adoption of m-learning in the near future.

8.1.3.3 Facilitating Conditions

The quantitative results of this research revealed that the facilitating conditions – comprising the resources and knowledge necessary to use mobile learning, the existence of a dedicated support team, and the university administration's encouragement to use mobile learning – represented the third most significant predictor of faculty members' adoption of m-learning, and had a positive impact in encouraging faculty members to use m-learning in their current and future practice. One of the advantages of the mixed methods approach is that it enables the researcher to gain in-depth data regarding specific issues. Here, the interview findings showed

that the educators' lack of adequate knowledge and awareness about how to deploy m-learning within their professional practice was the most common factor to hinder them in adopting and using m-learning. An increase in knowledge could be generated through offering training courses to inform teachers about the potential uses of portable devices, and to develop their understanding of the possible benefits of using this technology by providing examples of effective and developed m-learning intervention experiences that would help them to improve their academic teaching and facilitate positive learning experiences for their students.

Moreover, as well as a lack of knowledge about m-learning, the respondents also cited a lack of proper resources for m-learning practice. These resources could be improved by providing high-quality infrastructure, including internet and Wi-Fi connections, both inside and outside the university, supplemented by training courses to teach educators how to best utilise these resources in their teaching and learning (Naismith et al., 2004) and what digital mobile applications are available for educational use (Futurelab et al., 2004).

In addition, mobile devices must be accessible to both instructors and students. Although there is a high number of mobile subscriptions in Saudi Arabia, the participants stated that some students and instructors still do not have smartphones and/or internet-connected devices, and these findings are also supported by Al-Fahad (2009) and Al-Shehri (2013). Chapter 7 showed the reasons for this, and offered some solutions to address the issue. However, faculty fears regarding the use of personal devices was one common concern that no solutions were offered for, as the efficiency and usability of their digital phones are issues, as are practical concerns such as using up storage, screen size and battery life. These could all lower their willingness to use personal mobile devices for m-learning.

The interview results also revealed concerns about the unequal distribution of IT infrastructure across the colleges in the university. In addition to the lack of infrastructure, internet-networking inside university and limited website access were also factors that discouraged teachers from using m-learning. It is well known that using mobile internet-enabled devices on campuses that offer high-quality Wi-Fi increases the prospects of promising implementations of m-learning (Wagner and

Wilson, 2005). In addition to the previous resource limitations, the study revealed that there is also a lack of instructional mobile applications. Hence, university administrations should make internet and Wi-Fi networks available to all faculties and departments inside university campuses, as well as training educators to programme mobile applications by themselves, or else providing a programming team that can design and develop affective mobile apps that serve several instructional curriculums in either Arabic or English (based on teachers' needs).

The third facilitating condition was the lack of support teams to help instructors solve problems that may occur during the deployment of mobile learning. This lack can be attributed to m-learning not being formally adopted by the university. If m-learning were officially deployed, the university would then provide a technical team to support its application.

Finally, the university's lack of encouragement also negatively impacted on faculty members' adoption of m-learning. University encouragement could be provided through means such as expert programming teams to help in developing Arabic digital content, financial rewards for teachers who use m-learning in their teaching practice, or by making the use of m-learning compulsory for all teachers.

8.1.3.4 Performance Expectancy

Although social norms, facilitating conditions, and perceived trialability were the most significant predictors of faculty members intentions to use m-learning in their current and future teaching practice, the other four constructs were also significant, and required further exploration and discussion. Performance expectancy was found to have a positive influence on teachers' perceptions towards using m-learning. The data analysis revealed that the faculty members who perceived integrating m-learning into their teaching to be useful were more likely to report an intention to use m-learning in their current and future teaching practice. The ability to use mobile devices in learning to support users to achieve their objectives more quickly surely inspires the acceptance of this technology (Akour, 2009).

The reason that performance expectancy has a strong impact on teachers' intentions to use m-learning is that, if educators believe that integrating m-learning will improve

their students' learning and help them to engage in planned activities, and they also believe that it will provide opportunities for improving their teaching performance, then they will be more likely to adopt m-learning in their professional practice. Hence, instructional designers must take technical obstacles into account and try to design easy-to-use mobile learning applications. In addition, scholars and universities need to ensure that a good infrastructure and training system is provided to support and promote the benefits of mobile learning before m-learning initiatives are piloted.

8.1.3.5 Effort Expectancy

In this study, effort expectancy played a major role in the faculty's adoption of m-learning. Its influence on teachers' intentions to use m-learning was negative, which means that faculty members faced difficulties in using and implementing m-learning in their teaching practices. It is unsurprising that a high proportion of participants agreed that using m-learning is not simple, not clear, and not readily understandable, as it needs skills to learn how to operate mobile learning in higher educational classes. Moreover, this is connected with the dependent variable of mobile usage skills, which was also a significant moderator among other demographic data. Instructors need skill to use mobile technology and to learn how to incorporate it into their professional practices in order to adopt this technology (Pianfettil, 2001). Such technological skills include capabilities to access, manage, and assess digital resources (Chen & Denoyelles, 2013). It is noticeable that educators with good technical skills in using mobile devices are more capable of adopting m-learning and more likely to do so.

In addition, there was a strong positive correlation between performance expectancy and effort expectancy – high levels of performance expectancy were associated with high levels of effort expectancy. This means that faculty members who perceived the benefits and effectiveness of using m-learning in classes more positively were more likely to perceive it to be easy to use. Thus, universities should provide training sessions to raise instructors' abilities and knowledge of m-learning so that they are more disposed to take advantage of its implementation.

8.1.3.6 Social Influence

Social influence was also found to have a positive impact on faculty members' intentions to adopt m-learning. However, most lecturers were not urged by their peers or colleagues to use this new method of teaching, and they did not generally observe any use of mobile learning within their department. However, many believed that their students were willing for m-learning to be integrated into the classes. The faculty members' decisions to adopt and use m-learning may thus have been encouraged more by their (perceptions about their) students than by their peer educators, departments or university administration. Here, it is advisable that the universities' administration and instructors pay more attention to how to exploit this new trend of learning and encourage their students to disseminate its culture among themselves in the first place, and then among other peer educators. It was noticed that the amount of late adopters would likely increase at a much faster rate amongst educators if the number of their peers using mobile learning increased (Rogers, 2003).

8.1.3.7 Resistance to Change

Faculty members' resistance to change was a critical obstacle to the adoption of m-learning. The results indicated a strong relationship between resistance to change and faculty members' intentions to adopt mobile learning both now and in the future, with it having a significant, negative influence on the adoption and use of m-learning. One reason for this may have been that most faculty members were unaware of the benefits of blending traditional teaching methods with m-technology in educational environments in relation to improving student learning and the quality of teaching performance. In addition, familiarity with traditional methods of teaching and learning can lead both teachers and students to be uncertain about changing to the use of technological educational methods. Specifically, the introduction of ubiquitous devices within education is viewed with scepticism by some parents and students, who are uncertain about whether they can provide an effective means for learning or whether they are really just for entertainment. This can create resistance to implementing m-learning. Parents, students and teachers must thus be aware of the potential that mobile devices have within education environments.

In addition, teachers are often unconfident about their abilities to use mobile devices for teaching, and this could discourage them from trying new methods of teaching and learning. The higher the levels of resistance to change in educators are, the lower the levels of their current and future intentions to use m-learning are likely to be. Therefore, in order to decrease levels of resistance to change and increase acceptance of m-learning, universities should provide support for educators than enables them to understand the benefits of using this technology with their learners. This can be done by developing their skills and knowledge through training courses. Mobile learning helps to improve the quality of traditional classes by adding a blended approach to learning (Naismith et al., 2004).

8.1.4 Research Question 3

Is there a statistically significant relationship between faculty members' personal characteristics (including gender, age, academic qualifications, academic position, years of teaching experience, mobile device usage) and their perceptions towards using mobile learning?

The findings indicated that skill in using mobile devices was the only variable to contribute significantly to the model. This indicates that a person's decision to use m-learning in their current or future teaching practice is influenced by their ability to use it, and the more skilled a person is in using mobile devices, the more likely he or she is to intend to use m-learning in her current and future practice. Specifically, the additional data analysis results demonstrated that performance expectancy, social influence and resistance to change were influenced by mobile device usage. However, other personal characteristics did not influence faculty members' intentions to use m-learning in their current or future teaching provision.

Although the majority of faculty members were familiar with some of the simple functions on mobile devices, few participants were able to perform complex tasks that required a higher level of expertise. Thus it was evident that the more skilled teachers are in using portable Wi-Fi enabled devices, the higher the levels of perceived usefulness they see them as having, the more they are influenced by others to use them, and the more willing they are to adopt mobile learning. The skill of educators in using

portable Wi-Fi devices in their teaching routines is thus a critical aspect in their choosing to use mobile learning (MacCallum et al., 2014).

I contend that a nescience of the benefits of m-learning and a lack of the requisite skills are the key factors that prevent most instructors from adopting m-learning. It was lecturers' positive perceptions about the use of IT that sped up its adoption in learning (Zhao and Frank, 2003), and holding good IT skills may motivate both teachers and students to use technology in education. The best solution for addressing the lack of m-learning skills is thus to provide training courses for university teachers so that they can develop and enhance their mobile usage skills and develop positive perceptions about its use, thus speeding up its uptake.

A surprising finding of this research was that there were no interactions between the extended UTAUT constructs and gender in relation to the educators' perceptions towards adopting m-learning. It seems that gender differences on using m-learning have started to fade in Saudi tertiary education as female lecturers have become more experienced and skilled in using advanced m-learning methods. In addition, they share the male faculty members' perceptions regarding the value and attributes of using mobile devices in their teaching routine, as well as perceiving shared barriers for adopting m-learning. Moreover, Saudi women have equal opportunities to men in education, as well as in various other areas of the labour market, although they are still limited in the range of disciplines they can study in higher education and in the jobs and careers that they can pursue. Consequently, the two genders might have similar perceptions and attitudes regarding the pros and cons of adopting m-learning in teaching and learning.

In addition, Saudi women have a large degree of freedom within the contemporary urban environment as a result of Saudi culture's openness to other cultures. However, university regulations help to create a dominant male voice for both male and female campuses as commands are issued from the men's section, and do not allow room for women to be involved in decision-making. Nonetheless, as both males and females are under the same umbrella in terms of their culture and the educational system, the influence of the other determinant factors and social norms to accept and use m-learning are the same for both males and females.

Age was also found to not be a significant moderator of faculty members' intentions to use m-learning in their current or future teaching practice. Further and detailed data analysis and statistical tests indicated that effort expectancy and resistance to change were affected by age, however. Hence, the older teachers perceived m-learning as being hard to use and, for this reason, resist adopting it. Despite the fact that social norms were significant predictors of faculty members' adoption of m-learning, the age variable had no effect in determining their attitudes.

With regard to academic position, the data analysis results indicated that performance expectancy, effort expectancy, perceived social norms and resistance to change were all influenced by the level of participants' academic qualifications. This means that participants holding bachelors or masters degrees perceived m-learning to be an easier to use and more useful tool for teaching and learning than those holding doctoral degrees, and were thus more likely to use or intend to use m-learning. Excitingly, teachers with bachelors degrees were not as influenced by Saudi social norms as those holding higher degrees.

Performance expectancy, perceived trialability, and resistance to change were significantly determined by years of teaching experience. The data analysis revealed that participants with less than five years teaching experience perceived m-learning to be more useful and trialable, and were more likely to change from traditional methods of teaching than the group that had twenty years or more teaching experience.

8.2 The Contributions and Implications of the Research

This study has shown its importance from the beginning – from determining the research problem, throughout the data collection, through to the presentation of its conclusion. Numerous different aspects of the research's contributions and implications were signposted, including its theoretical, methodological, educational, managerial, and social outputs.

In terms of its implications for research models, my research provided support for the Unified Theory of the Acceptance and Use of Technology (UTAUT), creating a unique model that included the factor of Saudi social norms – the most significant determinant influencing the adoption of m-learning in higher education in Saudi

Arabia. The model for the research comprised seven independent factors, and two theories of technological acceptance were utilised. Firstly, the UTAUT was used, which classifies 'performance expectancy', 'effort expectancy', 'social influence', and 'facilitating conditions' as variables that influence intentions to use technology (Venkatesh et al., 2003). The 'behavioural intention to use mobile learning' from UTAUT was replaced with 'current and future intentions to use mobile learning' due to the absence of mobile learning interventions undertaken during my research programme in the context of study. Secondly, the 'perceived trialability' construct of the Diffusion Innovation Theory (DIT, Rogers, 2003) was used. This was the only construct taken from this theory because the other constructs are similar to those of the UTAUT. For example, DIT has the construct of 'relative advantage', which is the same as 'performance expectancy' in UTAUT, and the construct of 'complexity' in DIT is similar to 'effort expectancy' in UTAUT. However, the 'trialability' construct has no equivalent in UTAUT, and hence was adopted in this study as it has frequently been shown to have a significant effect on the adoption of m-learning.

Additionally, two further external constructs were added to the model – 'resistance to change', which was inherited from Kim and Kankanhalli (2009), Manzoni and Angehrn (1997) and Nov and Ye (2008); and 'social norms', which added the researcher's own construct to the research model.

The model utilised in this research extended the extant typology of factors that impact on attitudes towards m-learning. It was statistically significant, identifying variances in the intentional use of m-learning as comprising 70.3% of faculty members' intentions to use m-learning. In addition, the internal consistency reliabilities of the model's constructs were verified. Using both quantitative and qualitative research findings and data analysis enabled me to draw my developed and extended UTAUT research model, which is presented in Figure 8.1 below. The resultant model was slightly different from the foundational model that was illustrated earlier in the Research Theoretical Framework section. According to the research findings, all constructs in the initial model were statistically significant, and were thus all kept in the developed model. In addition, 'anxiety' and 'financial support' factors were frequently cited in the interview phase, although there were no survey items in the questionnaire phase for exploring these constructs. Thus, these two factors were added

to the research model, however, they need to be further tested in the future study. Although the ownership factor was mentioned in the qualitative data phase, it would also be a factor worth studying in future research with regard to student perceptions.

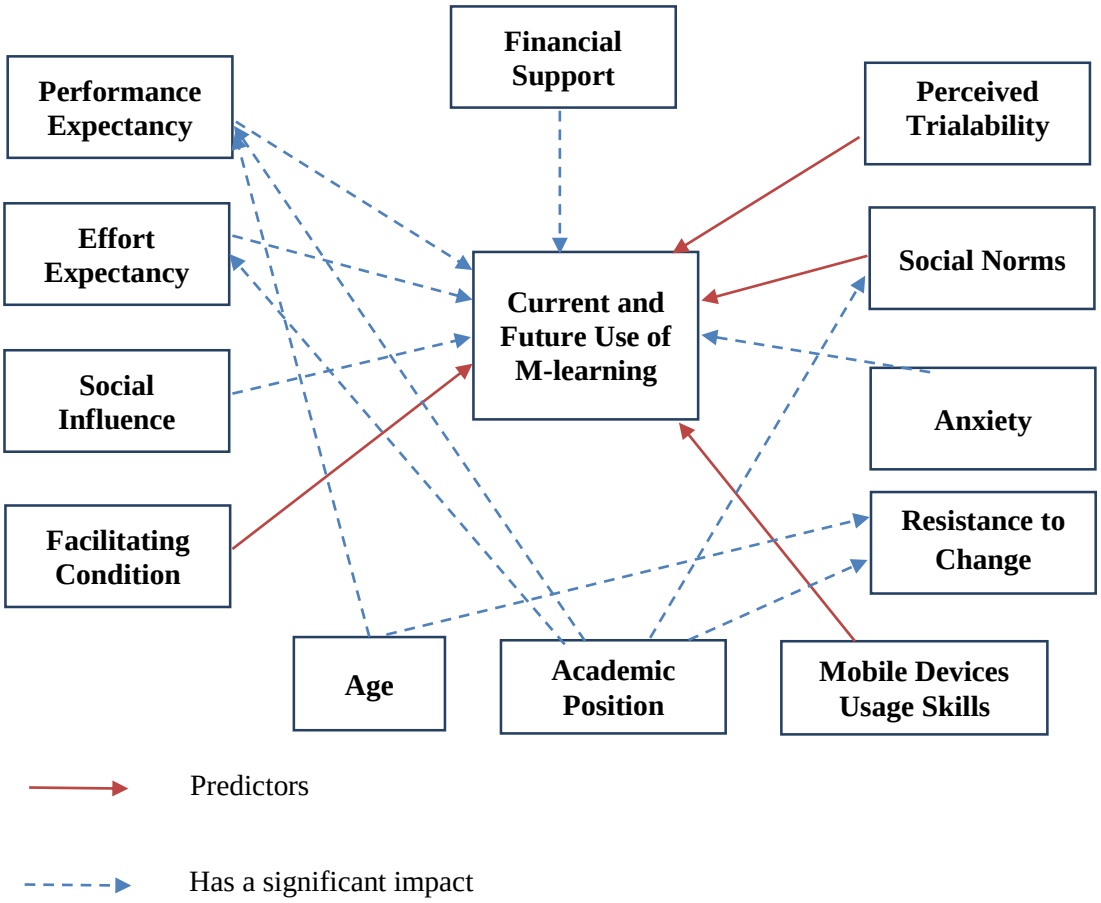

Figure 8.1: Final Research Model

In exploring the constructs taken from the models, this study examined the effects of any factors that could be reasonably hypothesised to influence educators' current and future intentions to use mobile learning, including gender, age, academic position, years of teaching experience, and mobile usage skills. It is worth mentioning that the UTAUT only utilised gender, age, experience, and voluntariness. Voluntariness was excluded from the formulation of my research model from the beginning, as the use of m-learning in King Abdulaziz University is voluntary. In addition to the factors considered in UTAUT, I believed initially that the variables of academic position and

years of teaching experience could be moderators to the current and future use of m-learning, and thus they were incorporated. However, the data analysis suggested that these two variables are connected and could be combined. For instance, teaching assistants and lecturers nearly always have less than ten years teaching experience, whilst professors ten or more years teaching experience. In addition, as gender did not show any interaction with faculty members' intentions to use m-learning, it was decided that this variable should be excluded from the developed model. Although age, teaching experience, and academic position do not have a direct impact on the model constructs, like mobile usage skills, they nonetheless had a bearing on some of the research factors, as shown in the data analysis. In addition, the UTAUT and the studies that attempted to verify this theory examined the relationship between performance expectancy and effort expectancy only. However, this thesis contributed to the body of literature by looking at the correlations between each construct (these correlations are listed in Table 4.10).

With regard to its contributions to the extant literature, this thesis had unique aims and produced new findings, particularly in relation to the research setting (i.e. KSA) and how the social norms there influence faculty members' intentions to use m-learning, as well as concerning the way in which gender is involved in this context. The results provide the first point of reference in the literature for future programmes seeking to design and apply m-learning interventions in Arab educational contexts.

A large body of literature on m-learning uses UTAUT, but a limitation in m-learning acceptance studies is that most of the research for them is conducted in Western contexts alone (Schepers & Wetzels, 2007; Traxler, 2007). This generates little useful or reliable evidence about the deployment of m-learning in other cultures. Hence, this research provides an important attempt to apply the UTAUT and the extended constructs relating to it within a non-Western culture – in this case, in the context of Arab higher education. In addition, most of the research conducted on m-learning in Arab higher education has focused on determining and measuring its impact statistically rather than on finding out the reasons and explanations behind these statistics. Moreover, most studies that have explored user acceptance and the use of m-learning have focused on students and the factors that impact on them (Akour, 2009; Cheon et al., 2012; El-Gayar & Moran, 2006; Jairak et al., 2009; Mac Callum &

Jeffrey, 2013; Nassuora, 2012; Thomas et al., 2013), with little research having been conducted on university teachers' acceptance of it (Akour, 2009; Ifenthaler & Schweinbenz, 2013; MacCallum et al., 2014). Thus, my research findings add valuable and unique information for future research that seeks to understand the causes and impacts of social norms and other constructs on the process of adopting m-learning in Arab contexts.

According to the prior literature, only a small amount of research has utilised a mixed methods approach to study the acceptance of mobile learning, with many researchers using a purely quantitative questionnaire method. Thus, the current research also contributes to the extant body of literature through employing an online sequential quantitative-qualitative mixed methods approach in which these methods complement each other. The online quantitative data collection technique used faculty members' perceptions of m-learning to capture the attributes and possible barriers to implementing it in Saudi higher education. Online interviews, meanwhile, were important for explaining the survey results and for adding in-depth information about the research findings. Deploying both methods provided much more in-depth data than using a single method would have, explaining the research results and revealing the reasons for the significant effect of Saudi social norms and the conservative nature of Saudi universities on the adoption of m-learning.

Most importantly, online interviews enabled me, as a female researcher, to reach both male and female interviewees in Saudi Arabia from my home or office in the UK, and the participants were able to speak freely in an online and 'faceless' environment through Adobe Connect software (also from their work or homes). It is worth highlighting that the software utilised for the online interviews was easy to use, that the interviewees were comfortable with it, and that they did not need training to use it. In summary, the e-interview style was evidenced to be advantageous. This approach could open up the gates for a large amount of researchers in different subjects to conduct research internationally. Moreover, this research approach makes social contributions, as it showed how the need for the presence of a *Mahram* and the need to find an agreeable place for interview meetings could both be overcome through the use of web-based video conferencing software. Thus, using this method could help future research in Arab higher educational settings to flower, as it enables male and

female researchers to overcome the obstacles generated by gendered social norms, as well as to try out a new research methodology.

In addition, utilising a hybrid approach of qualitative methods of thematic analysis, incorporating both the data-driven inductive approach (Boyatzis, 1998) and the theory-driven deductive a priori template of codes approach (Braun and Clarke, 2006) has empowered the process of analysing the qualitative data. This hybrid method has also been used rarely in the literature, specifically in the context of m-learning. Thus, using this rigours data analysis method may provide a good reference for other researchers who wish to deploy it in their future research.

The relationship between social norms and the acceptance of m-learning is also briefly mentioned in Almarwani's (2011) work. However, her thesis only utilised a quantitative approach, and did not either study the social norms as an extended factor nor provide deep explanations about the challenges that using ubiquitous devices in learning bring, or how and why the adoption of m-learning may influence Saudi social norms. Thus, this thesis is a pioneering piece of research in its study of this phenomenon.

From the educational perspective, this research model provides an introductory framework that educationalists could employ to understand the benefits of using mobile devices in educational settings as they seek to become more aware of what preparations they need to make to exploit m-learning, what tactics they could plan to use once they have adopted it, and what they should ask the university to do in order to steer them towards delivering it successfully. If the obstacles that are presented in this research can be overcome, successful m-learning outcomes could then be generated in the near future

In addition, this integration could lead to 'research-led' or 'research-enhanced' teaching (Brew, 2002; Velautham and Picard, 2009), in which teachers would assess and evaluate the interventions brought about by using m-learning as a new method for teaching in Saudi contexts, and enrich the Arab literature on m-learning. This, in turn, would help to increase the quantity and quality of their research outputs, increasing the university's world-class ranking.

The role of universities' administrations run in parallel with those of educationalists' roles, as both should pay attention to the factors that influence lecturers' adoption of mobile learning and consider them when introducing mobile technology into the teaching environment. In addition, managers and decision-makers can benefit from these results through adopting mobile technology and blending it as an extra and supported method for learning, as well as by officially deploying m-learning within university campuses. Moreover, the university should assess and evaluate m-learning interventions and offer students the chance to complete surveys to assess their teachers. This assessment by the university and the students should also be used to reward educators who have successfully adopted m-learning. My findings revealed that the obstacles that the faculty members perceived as being the greatest ones for adopting m-learning can and must be addressed by university administrations to facilitate and support successful m-learning. Most importantly, Saudi universities need to provide teachers and students alike with training courses, resources, proper infrastructure and Wi-Fi, support teams, encouragement, financial support, opportunities to trial m-learning, and clear m-learning guidelines.

Students already have smartphones in their pockets, and are already willing to exploit this technology for learning. However, if m-learning is not applied formally in Saudi or Arab higher educational institutions, students may misuse it. Hence, Saudi and Arab universities should consider officially generating a culture of using mobile devices for teaching and learning across the university community and try to direct universities down the right path. Moreover, m-learning could be used not only for the face-to-face mode of learning, but also for distance and online learning. In particular, the southern region of Saudi Arabia (Najran) is engaged in a war with Yemen's Houthi rebels and, as a result, the universities there are closed. Some of the soldiers and/or residents who live in this area are university students, and hence using mobile distance learning would provide a suitable way for them to continue their learning.

My findings will help instructional designers, who will be able to use the determinants that affect m-learning adoption in designing and employing stages of mobile learning applications. The official application of m-learning within Saudi higher education would open the gates for the Arab and Western programming market alike, who will then race to design and establish Arab digital apps that benefit Saudi higher education,

match educator and student needs, and fit with university curriculums. Several considerations must be taken into account for this to be successful, particularly those of social norms, which were the most significant predictor of faculty members' acceptance and use of m-learning. In addition, designers must pay attention to the factors of performance expectancy and effort expectancy by making sure that mobile apps are easy to use and beneficial for instructors and learners alike. Moreover, it is necessary to create a cooperative atmosphere between lecturers and mobile learning inventors in relation to the process of designing mobile apps. Educators could provide their ideas about the content and structure of the apps, and then have the chance to pre-test them before they were actually deployed. Programmers, on the other hand, need to be able to take up all these threads and stitch together a professional mobile application.

8.3 Limitations

This research has several implications, which were presented earlier in this chapter. However, it also has some limitations. First of all, time limitations meant that this thesis could provide a case study of one Saudi university only, and thus the results cannot be generalised to all Saudi universities. Although the use of the mixed methods approach provides research that has the strength of being able to generalise findings, in my case, there was a lack of generalisability because King Abdulaziz University in Jeddah, Western Saudi Arabia, has its own culture and traditions that differ from those of other areas of Saudi Arabia. As stated earlier, the culture in this area is more 'open', and Jeddah has a largely urban society, which influences individuals to accept new technologies faster than other rural Saudi peoples across different areas of the country do. Hence, expanding my research to these areas could eventually lead to different results.

Moreover, this research targeted the perceptions and intentions of faculty members towards adopting m-learning. It did not focus on students' perceptions of it or on actual m-learning interventions. However, exploring the actual use of m-learning is not possible without understanding the determinants that generate intentions to use m-learning in educational practice.

Although the sample for the survey phase was representative of university teachers, consisting of both genders, from different age groups, from several departments, and with diverse academic levels, the number of participants was relatively small (n=279). I collected the data for about six months in order to include as high a number of respondents as possible. However, university teachers in Saudi Arabia often do not check their email regularly, which results in slow survey responses. In addition, paper-based surveys may be more suitable for people who are less computer literate or who are infrequent computer users. However, although it was easy to distribute paper-based questionnaires across the women's section of the university, I had to recruit a man to distribute the survey throughout the male section. It thus took a long time to distribute, collect, and gather the results into one file, and then to analyse the data. As less than half of the distributed surveys received responses, and due to the short time that this research had to conduct the data collection, analysis, and writing up, future researchers may consider spending more time collecting data.

The sample of interviews used for this thesis was reasonable and representative. In the beginning, I planned to interview a maximum of thirty and a minimum of twenty educators. However, I found it hard to reach twenty participants to participate in online interviews. Furthermore, although I had a high-speed and good-quality internet connection, some of the participants (n=3) who were interviewed from their university offices or from coffee shops had low-speed and poor-quality internet or Wi-Fi networks. This reinforced the finding regarding the importance of a good internet infrastructure at KAU. On the other hand, most online interviews that were conducted from interviewees' homes often ran more smoothly.

The survey instrument might have contained a small element of bias that impacted on the results, as the responses of participants to the research instrument may have included some misinformation. However, the variety of responses – which ranged from strongly agree to strongly disagree – demonstrated a willingness to respond reflectively and honestly. In addition, for the data analysis, the demographic data used to measure the age, academic position and teaching experience of faculty members should have been split into two levels only – younger (aged less than 50) vs. older (aged 50 and over); masters degree or less vs. doctoral degree; and ten years or less teaching experience vs. more than ten years teaching experience. Moreover, the survey

could have benefitted from some questions that determined the faculty members' skills at performing difficult tasks via mobile devices for teaching.

The research model was limited to examining the impact of seven factors on m-learning acceptance, and all factors were statistically significant of faculty members' intentions to adopt and use m-learning. In addition, further factors could have been added to the model as they emerged from the qualitative data collection phase, such as 'anxiety', 'ownership', and 'financial support'.

8.4 Recommendations and Future Research

This research focused on the aforementioned seven factors as they were hypothesised to have the most significant influence on faculty members' adoption of m-learning in their teaching practices. However, other concepts, such as agency, could also be considered in future research. In addition, further theoretical perspectives on m-learning could be considered for future research as well, and as providing a next step in developing this study. These could include the Conversational Framework – which can be viewed as an appropriation model that locates communicative activities within teaching and learning frames (Laurillard, 2013), and Activity Theory – which perceives mobile learning as a 'process of coming to know through conversations across multiple contexts amongst people and personal interactive technologies' (Sharples et al., 2008, p.5). Both theories could be used to design a sound m-learning model for faculty members, facilitating the deployment of m-learning by the faculty as well as providing theoretical perspectives that enable m-learning interventions to support faculty teaching.

This research could be greatly enhanced by being generalised. Hence, future studies could be conducted within a number of Saudi universities using the mixed methods approach. Indeed, conducting similar research on different areas across Saudi Arabia could increase the evidence concerning social norms and culture, and develop a much broader understanding of the different faces that this issue may take throughout the country. Comparative research could then be conducted to link the results of these regions and to try to find connections. Such studies and credible information could speed up the adoption of m-learning across Saudi higher educational institutions.

In addition, future research could target the perceptions of students about adopting m-learning, and could also focus on institutions' policies for allowing and controlling m-learning schemes. Moreover, it could focus on the actual use of m-learning, taking the determinants revealed in this study into account when designing m-learning experiments. The survey instrument could be developed further in future research by taking all the limitations that have been identified in this research into account. In addition, the social norms factor explained three elements as barriers to the adoption of m-learning, including university conservativeness regarding mobile devices equipped with a camera; students' misuse of mobile devices, and the issue of women's privacy. It is worth noting that the last two items were statistically significant. Hence, future research could focus on these two issues and study them in more details, as well as considering other issues in the Arab social culture and tradition.

In addition, the video conferencing software used in conducting the online interviews (Adobe Connect) provided an appropriate and useful method for conducting this research, and should be considered in future research to help researchers that need to reach a large number of participants and overcome obstructing social norms and cultural barriers. The topic of mobile learning is relatively new in Saudi higher education, and thus provides researchers and instructors from a range of specialities with numerous opportunities – either to use these mobile devices in their teaching and study the impact of m-learning on their professional practices, or to use m-learning and examine its affects on learners' outcomes and achievements. Finally, universities and instructional programmers could develop new mobile applications for assessments and evaluations that could be developed through conducting research-led and enhanced teaching.

References

Abanumy, A. and Mayhew, P. (2005). M-government implications for e-government in developing countries: The case of Saudi Arabia. In *EURO mGOV* (Vol. 2005, 1-6).

Abbasi, M. S., Tarhini, A., Hassouna, M. and Shah, F. (2015). Social, Organizational, Demography and Individuals' Technology Acceptance Behaviour: A Conceptual Model. *European Scientific Journal*, 11(9).

Abu-Al-Aish, A. and Love, S. (2013). Factors influencing students' acceptance of m-learning: An investigation in higher education. *The International Review of Research in Open and Distributed Learning*, 14(5).

Agarwal, R. and Prasad, J. (1998) A conceptual and operational definition of personal innovativeness in the domain of information technology. *Information Systems Research* 9, 204-215.

Akour, H. (2009) *Determinants of mobile learning acceptance: an empirical investigation in higher education* (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses database (UMI No. AAT 3408682).

Al-Abdulkareem, R., & Hentschke, G. C. (2014). Textbooks and Constructivist Pedagogy in Saudi Arabian School Classrooms. *Journal of Curriculum and Teaching*, *3*(2), p13.

Al-alak, B.A. and Alnawas, I.A.M. (2011). Measuring the Acceptance and Adoption of E-Learning by Academic Staff. *Knowledge Management & E-Learning: An International Journal,* 3(2). Online at: https://www.uop.edu.jo/download/research/members/1042_2998_Al-a.pdf [Accessed on 11/10/2014].

Alamri, M. (2011). Higher education in Saudi Arabia. *Journal of Higher Education Theory and Practice*, *11*(4), 88.

Al-Asmari, M. (2008). Saudi labor force: Challenges and ambitions. *JKAU: Arts & Humanities*, 16(2), 19-59.

Alebaikan, R. (2010) *Perceptions of blended learning in Saudi universities*. PhD Thesis, University of Exeter.

Alebaikan, R. and Troudi, S. (2010) Online discussion in blended courses at Saudi universities. *Procedia – Social and Behavioral Sciences*, 2(2), 507-514.

Aleqtisadiah Online Journal. (2013). Saudi Keekers maintain a leading position, with some disappointing misuse. See also website: http://www.aleqt.com/2013/02/27/article_735005.html [Accessed on 18/09/2015].

Al-Fahad, F. (2009) Students' attitudes and perceptions towards the effectiveness of mobile learning in King Saud University, Saudi Arabia. *The Turkish Online Journal of Educational Technology*, 8 (2), 111-119. Online at: http://aasrc.org/aasrj/index.php/aasrj/article/view/248/188 [accessed on 02/08/12].

Alfarani, L. A. (2014). Influences on the adoption of mobile learning in Saudi women teachers in higher education. In *International Conference on Interactive Mobile Communication Technologies and Learning (IMCL), 2014*, 30-34. IEEE.

Al-Gahtani, S. S. (2004) Computer technology acceptance success factors in Saudi Arabia: An exploratory study, *Journal of Global Information Technology Management*, 7(1), 5-29.

Al-Gahtani, S., Hubona, G. and Wang, J. (2007) Information technology (IT) in Saudi Arabia: Culture and the acceptance and use of IT. *Information & Management* 44, 681–691.

Al-Ghadyan, A. M. A. (2004). *The attitudes of university academic staff towards e-learning and in-service training in Saudi Arabia: an analytical study* (Doctoral dissertation, University of Durham).

Alharbi, A. (2004). The Degree of science teachers' use of the constructivist ideas in teaching in Saudi Arabia. Unpublished Master thesis. The Hashemite University. Amman, Jordan. (in Arabic).

Alharbi, A. (2015). *The perspective of students and faculty members regarding the use of technology in a constructivist learning environment*(Doctoral dissertation, State University of New York at Fredonia).

Alhawiti, M. (2011) Faculty Perceptions about Attributes and Barriers Impacting the Diffusion of Online Education in Two Saudi Universities. Online at:

http://scholars.indstate.edu/bitstream/10484/1758/1/Alhawiit%2c%20Mohammed.PDF [accessed on 19/10/12].

Al-Jabri, I. M. and Sohail, M. S. (2012). Mobile banking adoption: Application of diffusion of innovation theory. *Journal of Electronic Commerce Research*, 13(4), 379-391.

Al-Jammal, R. (2013). The impact on the use of social networking on the formation of moral and ethical pattern on Saudi youth. Online at: http://dalya6848.blogspot.co.uk/2014/04/3.html [Accessed on 24/02/2015].

Al-Jarf, R. (2006). Large student enrollments in EFL programs: Challenges and consequences. *Asian EFL Journal Quarterly*, *8*(4), 8-34.

Aljuaid, N. M. F., Alzahrani, M. A. R. and Atiquil, A. Y. M. (2014). Assessing Mobile Learning Readiness in Saudi Arabia Higher Education: An Empirical Study. *The Malaysian Online Journal of Educational Technology*, 1.

Al-Kahtani, N. K., Ryan, J. J., and Jefferson, T. I. (2006). How Saudi female faculty perceive internet technology usage and potential. *Information, Knowledge, Systems Management*, 5(4), 227-243.

Al-Khalifa, H. (2008) Mobile SRS: a classroom communication and assessment service. In *Proceedings of the Innovations in Information Technology, IIT*, December, 342-346.

Ally, M. (2009). *Mobile learning: Transforming the delivery of education and training*. Athabasca University Press.

Almalki, A. (2011) *Blended learning in higher education in Saudi Arabia: a study of Umm*. Al-Qura university, PhD Thesis, School of Education, RMIT University.

Al-Manaseer, S. and Malibari, A. (2012) Improve Teaching Method of Data Mining Course. IJMECS, 4(2), 15-22. Online at: http://www.mecs-press.org/ijmecs/ijmecs-v4-n2/IJMECS-V4-N2-3.pdf [accessed on 19/10/12].

Almarwani, M. A. (2011). ML for EFL: Rationale for mobile learning. In *Proceedings of the International Conference "ICT Language learning"*.

Al-Mengash, S. A. (2006). Analysis Study of the Saudi Education Policy and Recommendation for the Development. *Educational Science and Islamic Studies*, *19*(1), 381-440.

Al-Mubarak, B. (2013). Wi-Fi for Saudi Mobile Service Providers. Cisco IBSG. Online at: http://www.cisco.com/c/dam/en_us/about/ac79/docs/sp/Wi-Fi_Offloading_KSA.pdf [Accessed on 24/11/2015].

Alnahdi, G. H. (2014). Educational Change In Saudi Arabia. *Journal of International Education Research*, *10*(1), 1.

Alotaibi, M. B. (2013). Determinants of mobile service acceptance in Saudi Arabia: A revised UTAUT model. *International Journal of E-Services and Mobile Applications (IJESMA)*, 5(3), 43-61.

Al-Oteawi, S. M. (2002). *The perceptions of administrators and teachers in utilizing information technology in instruction, administrative work, technology planning and staff development in Saudi Arabia* (Doctoral dissertation, Ohio University).

AlSaadat, K. (2006) *Teachers Applications of Self-Learning at Different Levels in Public Schools in Saudi Arabia.* 13th Annual Symposium of the Saudi Organization for Education and Psychology Sciences. Riyadh, KSA.

AlSaadat, K. (2009) Mobile learning and university teaching. Paper presented at the *International Conference on Education and New Learning Technologies* (EDULEARN09), Barcelona, Spain.

Alsadoon, E. A. (2009). *The potential of implementing online professional training development for faculty in the College of Education at King Saud University* (Master's thesis, Ohio University).

Alsenaidy, A. and Ahmad, T. A. (2012). *A review of current state m-government in Saudi Arabia*. Department of Biochemistry, King Saudi University.

Alshayea, A. (2012). Improvement of the quality assurance in Saudi higher education. *Procedia-Social and Behavioral Sciences*, *47*, 2234-2236.

Alshehri, M. and Drew, S. (2010). Challenges of e-government services adoption in Saudi Arabia from an e-ready citizen perspective. *Education*, 29(5.1).

Al-Shehri, S. (2013). An outlook on future mobile learning in Saudi Arabia. *QScience Proceedings*, (12th World Conference on Mobile and Contextual Learning [mLearn 2013), 9.

Alshumaimri, A., Aldridge, T., & Audretsch, D. B. (2012). Scientist entrepreneurship in Saudi Arabia. *The Journal of Technology Transfer*, *37*(5), 648-657.

Al-Soraiey-Alqahtani, A. A. (2010) *The Effectiveness of Using E-learning, Blended Learning and Traditional Learning on Students' Achievement and Attitudes in a Course on Islamic Culture: an Experimental study*. Durham theses, Durham University. Available at Durham E-Theses Online: http://etheses.dur.ac.uk/817/ [accessed on 22/10/12].

Altameem, T. (2011) Contextual Mobile Learning System for Saudi Arabian Universities. *International Journal of Computer Applications*, 21(4), 21-26.

Alzu'be, A. F. (2012). The quality of Saudi graduates and the needs of Saudi labor market. *Research on Humanities and Social Sciences*, 2(9), 140-148.

Anderson, J. E., Schwager, P. H. and Kerns, R. L. (2006). The Drivers for Acceptance of Tablet PCs by Faculty in a College of Business. *Journal of Information Systems Education*, 17(4), 429.

Arabadvisors (2014). Online at: http://www.arabadvisors.com/arabic/Pressers/presser-030714.htm [accessed on 02/12/15].

Armando, A., Costa, G. and Merlo, A. (2013). Bring your own device, securely. In *Proceedings of the 28th Annual ACM Symposium on Applied Computing*, March, 1852-1858. ACM.

Avgerou, C. (2000). Recognising alternative rationalities in the deployment of information systems. *Electronic Journal of Information Systems in Developing Countries*, 3, 1–15.

Ayala Foundation. 2011. *text2teach: Bringing life to learning… Phase 3 Accomplishment Report*. Manila, Ayala Foundation Inc. http://digizines.com/ayala/ac2011/ [Accessed on 05/10/2015].

Baker, E. W., Al-Gahtani, S. S. and Hubona, G. S. (2007). The effects of gender and age on new technology implementation in a developing country: Testing the theory of planned behavior (TPB). *Information Technology & People*, 20(4), 352 – 375.

Baker, W. M., Lusk, E. J. and Neuhauser, K. L. (2012). On the use of cell phones and other electronic devices in the classroom: Evidence from a survey of faculty and students. *Journal of Education for Business*, 87(5), 275-289.

Baki, R. (2004). Gender-segregated education in Saudi Arabia: Its impact on social norms and the Saudi labor market. *Education policy analysis archives*, 12(28), 28.

Bakia, M., Mitchell, K. and Yang, E. (2007). *State strategies and practices for educational technology: Volume I—Examining the Enhancing Education Through Technology program.* United States Department of Education. http://www.ed.gov/rschstat/eval/tech/netts/netts-vol1.pdf [accessed on 01/10/12].

Ballagas, R., Rohs, M., Sheridan, J. G. and Borchers, J. (2004). Byod: Bring your own device. In *Proceedings of the Workshop on Ubiquitous Display Environments, Ubicomp*, September, 2004.

Bartlett, J. E., Kotrlik, J. W. and Higgins, C. C. (2001). Organizational research: Determining appropriate sample size in survey research appropriate sample size in survey research. *Information technology, learning, and performance journal*, 19(1), 43-50.

Bassey, M. (2000), *Case-study Research in Educational Settings*. Open University Press: Buckingham.

Bazeley, P. and Jackson, K. (Eds.). (2013). *Qualitative data analysis with NVivo*. Sage Publications Limited.

Becker, L. A. (1999). Effect Size Calculators. Online at: http://www.uccs.edu/~lbecker/ [Accessed on 23/12/15].

Bennett, S., Maton, K. and Carrington, L. (2011) Understanding the complexity of technology acceptance by higher education students. In T. Teo (Eds.), *Technology acceptance in education: research and issues*. Rotterdam, Netherlands: Sense, 63-77.

Borg, S., & Alshumaimeri, Y. (2012). University teacher educators' research engagement: Perspectives from Saudi Arabia. *Teaching and Teacher Education*, *28*(3), 347-356.

Brew, A. (2002, July). Enhancing the quality of learning through research-led teaching. In *Quality Conversations: HERDSA Conference, Perth*, pp. 7-10.

Brown, A. L., & Campione, J. C. (1996). *Psychological theory and the design of innovative learning environments: On procedures, principles, and systems*. Lawrence Erlbaum Associates, Inc.

Brown, I. (2009). Art on the move: Mobility–a way of life. Online at: http://ro.uow.edu.au/edupapers/87/ [Accessed on 22/10/2013].

Brown, J. D. (2002). The Cronbach alpha reliability estimate. *Shiken: JALT Testing & Evaluation SIG Newsletter*, *6*(1), 17-19.

Brown, J. S., Collins, A., and Duguid, P. (1989). Situated cognition and the culture of learning. *Educational Researcher*, 18(1), 32–42.

Burt, J. (2011). BYOD trend pressures corporate networks. *eWeek*, 28(14), 30-31. Retrieved from: http://web.ebscohost.com/ehost/detail?sid=6b0434ee-970c-40b4-85fc-ba28a2b4e26a%40sessionmgr104&vid=1&hid=113&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#db=voh&AN=65469365 [accessed on 20/09/12].

Calkins, D. (2009) The Potential Use of Mobile Communication in the Classroom. *Honors Projects in Communication.* Online at: http://digitalcommons.bryant.edu/honors_communication/4 [accessed on 25/10/12].

Callum, K. M. (2011) Adoption theory and the integration of mobile technology in education. Online at: http://mro.massey.ac.nz/bitstream/handle/10179/3684/02_whole.pdf?sequence=1 [accessed on 19/10/12].

Carlsson, C., Carlsson, J., Hyvonen, K., Puhakainen, J., & Walden, P. (2006). Adoption of mobile devices/services-searching for answers with the UTAUT.

In *System Sciences, 2006. HICSS'06. Proceedings of the 39th Annual Hawaii International Conference on* (Vol. 6, pp. 132a-132a). IEEE.

CDSI (2014). Online at: http://www.cdsi.gov.sa/english/ [Accessed on 03/10/2015].

Chanchary, F. H. and Islam, S. (2011) Mobile learning in Saudi Arabia – prospects and challenges. Paper presented at *The International Arab Conference on Information Technology* (ACIT'2011), Zarqa University, Jordan. Online at: http://www.nauss.edu.sa/acit/PDFs/f2535.pdf [last accessed on 01/08/12].

Chang, C. C., Yan, C. F. and Tseng, J. S. (2012). Perceived convenience in an extended technology acceptance model: Mobile technology and English learning for college students. *Australasian Journal of Educational Technology*, 28(5), 809-826.

Chau, P. Y. K. and Hu, P. J. (2002) Examining a model of information technology acceptance by individual professionals: An exploratory study. *Journal of Management Information Systems*, 18(4), 191–229.

Chen, C. M. and Chung, C. J. (2008). Personalized mobile English vocabulary learning system based on item response theory and learning memory cycle. *Computers & Education*, 51(2), 624-645.

Chen, G. D., Chang, C. K. and Wang, C. Y. (2008). Ubiquitous learning website: Scaffold learners by mobile devices with information-aware techniques. *Computers & Education*, 50(1), 77-90.

Chen, J. and Wei, D. (2012). Research on Advanced Web-Based Education via eLML Structure-Based Mobile Learning. In *Green Communications and Networks*, 461-468.

Chen, Y. S., Kao, T. C., & Sheu, J. P. (2003). A mobile learning system for scaffolding bird watching learning. *Journal of Computer Assisted Learning*,*19*(3), 347-359.

Cheng, Y. S., Yu, T. F., Huang, C. F., Yu, C. and Yu, C. C. (2011). The comparison of three major occupations for user acceptance of information technology: applying the UTAUT model. *iBusiness*, 3(02), 147.

Cheon, J., Lee, S., Crooks, S. M., & Song, J. (2012). An investigation of mobile learning readiness in higher education based on the theory of planned behavior. *Computers & Education*, *59*(3), 1054-1064.

Cheung, S. K. S. Yuen, K. S. and Tsang, E. Y. M. (2011) A Study on the Readiness of Mobile Learning in Open Education. *International Symposium on IT in Medicine and Education (ITME)* 1, 133-6. Retrieved from:

http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6130801 [accessed on 09/10/12].

Chung, K. S. and Lee, J. E. (2012) Design and Development of m-Learning Service Based on 3G Cellular Phones. *Journal of Information Processing Systems*, 8(3). Online at: http://jips-k.org/dlibrary/JIPS_v08_no3_paper11.pdf [last accessed on 22/10/12].

CITC (2010) Communication and Information Technology Commission 2009, Online at:
http://www.citc.gov.sa/English/Reportsandstudies/Reports/Documents/IT%20006%20E%20-%20IT%20Report%202010.pdf [last accessed on 26/10/12].

CITC (2014). Online at:
http://www.citc.gov.sa/English/MediaCenter/Newsletter/Documents/PR_ENL_020_EN.pdf

Clark, W. and Luckin, R. (2013). iPads in the classroom, London knowledge lab, available http://digitalteachingandlearning.files.wordpress.com/2013/03/ipads-in-the-classroom-report-lkl.pdf [accessed on 05/11/15].

Clarke, C. (2000) Coming attraction. *Wireless Review*, 17(12), 12-16.

Clothey, R. (2011) Opportunities and Obstacles: Technology's Potential for Expanding Access to Higher Education. Excellence in Higher Education, 2, 51-58. Online at: http://ehe.pitt.edu/ojs/index.php/ehe/article/view/29/28 [last accessed on 22/10/12].

CMO Council, (2015). Online at: https://www.cmocouncil.org/mena/mobile-marketing.php?view=all [last accessed on 09/12/15].

Cohen, J. (2013). *Statistical power analysis for the behavioral sciences 2nd Edition.* New York: Routledge Academic.

Cohen, L., Manion, L. and Morrison, K. (2011) *Research methods in education* (7th ed). London: Routledge.

Collins, T. G. (2005). English class on the air: mobile language learning with cell phones. *In Advanced Learning Technologies*. ICALT 2005. Fifth IEEE International Conference on (pp. 402-403). IEEE.

Cook, J. (2010). Mobile phones as mediating tools within augmented contexts for development. *International Journal of Mobile and Blended Learning*, 2(3), 1–12.

Cook, J, Mor, Y and Santos, P. (2015). Ideas in mobile learning. *Journal of Interactive Media in Education*, 2015(1): 18, pp. 1–2.

Cook, J. and Pachler, N. (2012). Online people tagging: Social (mobile) network(ing) services and work-based learning. *British Journal of Education Technology*, 43(5), 711–725.

Cook, J., Pachler, N. and Bachmair, B. (2012). Using social networked sites and mobile technology for Bridging social capital. In G. Trentin and Manuela Repetto (eds.), *Using network and mobile technology to Bridge formal and informal learning.* Chandos, pp. 31–56.

Cook, J. and Santos, P. (2016). Three phases of mobile learning state of the art and case of mobile help seeking tool for the health care sector. In *Mobile Learning Design*. Singapore: Springer, pp. 315-333.

Corbeil, J. R. and Valdes-Corbeil, M. E. (2007). Are you ready for mobile learning? *Educause Quarterly*, 30(2), 51.

Cox, B. E., McIntosh, K. L., Terenzini, P. T., Reason, R. D., and Quaye, B. R. (2010) Pedagogical Signals of Faculty Approachability: Factors Shaping Faculty-Student Interaction outside the Classroom. *Research in Higher Education*, 51, 767–788. Online at: http://www.springerlink.com/content/015k2360q16n4451/fulltext.pdf [accessed on 15/08/12].

Creswell, J. W. (1998), *Qualitative Inquiry and Research Designs: Choosing Among Five Traditions*. Thousand Oaks, CA: Sage Publications.

Creswell, J. W. (2008). *Research design: Qualitative, quantitative and mixed methods approaches*. London: SAGE.

Cruz, Y., Boughzala, I. and Assar, S. (2012). Opportunities and obstacles for mobile learning in a Business School. In *International Conference on Communications and Information Technology (ICCIT)*, June 2012, 58-61.

CWUR (2015). Online at: http://cwur.org/2015/saudi-arabia.html [accessed on 15/12/15].

Davis, F. D. (1985) *A technology acceptance model for empirically testing new end-user information systems: Theory and results*. PhD Thesis, Massachusetts Institute of Technology, Sloan School of Management, 1986. MICROFICHE COPY AVAILABLE IN ARCHIVES AND DEWEY. Online at: http://hdl.handle.net/1721.1/15192 [accessed on 01/08/12].

Davis, F. D. (1989) Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13 (3) 319-40. Online at: http://www.jstor.org/stable/pdfplus/249008.pdf?acceptTC=true [accessed on 01/08/12].

Davis, F. D. (1993/2003) User acceptance of information technology: system characteristics, user perceptions and behavioral impacts. *International Journal of Man-Machine Studies*, 38(3), 475-487. Online at: http://hdl.handle.net/2027.42/30954 [accessed on 01/10/12].

Davis, F. D., Bagozzi, R. P. and Warshaw, P. R. (1989) User acceptance of computer technology – a comparison of two theoretical models. *Management science*, 35(8). Online at: http://www.jstor.org/stable/pdfplus/2632151.pdf?acceptTC=true [accessed on 01/08/12].

Deng, S., Liu, Y. and Qi, Y. (2011). An empirical study on determinants of web based question-answer services adoption. *Online Information Review*, 35(5), 789-798.

Denzin, N.K. (2012) Triangulation 2.0. *Journal of Mixed Methods Research*, 6 (80). Online at: http://mmr.sagepub.com/content/6/2/80.full.pdf+html [accessed on 01/08/12].

Denman, B. D., & Hilal, K. T. (2011). From barriers to bridges: An investigation on Saudi student mobility (2006–2009). *International Review of Education*, *57*(3-4), 299-318.

Dick, B., Stringer, E. and Huxham, C. (2009). Theory in action research. *Action Research, 7(1), 5-12.*

Dillon, A. and Morris, M. G. (1996). User acceptance of information technology: theories and models. *Annual Review of Information Science & Technology*, 31, 3-32.

Dillon, A. (2001) User acceptance of information technology. In W. Karwowski (Ed), *Encyclopaedia of human factors and ergonomics.* London: Taylor and Francis. Online at: http://www.ischool.utexas.edu/~adillon/BookChapters/Dillon-acceptance.htm [accessed on 07/08/12].

Doane, D. P. and Seward, L. E. (2011). Measuring skewness: a forgotten statistic. *Journal of Statistics Education*, 19(2), 1-18.

Donaldson, R. (2011). Student Acceptance of Mobile Learning. *Electronic Theses, Treaties and Dissertations*. Paper 716. Online at http://diginole.lib.fsu.edu/etd/716/ [accessed 28/10/13].

Dooley, K. E. (1999) Towards a holistic model for the diffusion of educational technologies: An integrative review of educational innovation studies. *Educational Technology and Society*, 2(4), 35-45.

Doolittle, P. E., & Hicks, D. (2003). Constructivism as a theoretical foundation for the use of technology in social studies. *Theory & Research in Social Education*, *31*(1), 72-104.

El-Gayar, O. F. and Moran, M. (2006). College students' acceptance of tablet PCs: An application of the UTAUT model. *Dakota State University, 820*.

Fereday, J. and Cochrane, E. M. (2006). Demonstrating rigor using thematic analysis: A hybrid approach of inductive and deductive coding and theme development. *International Journal of Qualitative Methods 5 (1)*. Online at: https://www.ualberta.ca/~iiqm/backissues/5_1/PDF/FEREDAY.PDF [accessed on 12/05/2015].

Ferrari, A., Cachia, R. and Punie, Y. (2011). Educational change through technology: A challenge for obligatory schooling in Europe. In *6th European Conference of Technology Enhanced Learning, ECTEL: Towards Ubiquitous Learning*. London, New York: Springer Heidelberg Dordrecht, pp. 97-110.

Foddy, W. (1994). *Constructing questions for interviews and questionnaires: theory and practice in social research*. Cambridge: Cambridge University Press.

Gall, M. D., Borg, W. R., and Gall, J. P. (1996), *Educational Research: An Introduction*, 6th edn. New York: Longman.

Galliers, R. D., and Land, F. F. (1988). The importance of laboratory experimentation in IS research (authors' response). *Communications of the ACM*, 31(12), 1504-1505.

Garrison, D. R. (2011) *E-Learning in the 21st Century: A framework for research and practice* (2nd ed.). London: Routledge/Taylor and Francis.

Garrison, D. R., & Kanuka, H. (2004). Blended learning: Uncovering its transformative potential in higher education. *The internet and higher education*, *7*(2), 95-105.

Gavin, D. and Knight, H. R. (2012). Mobile Learning for Teachers in Europe. Exploring the Potential of Mobile Technologies to Support Teachers and Improve Practice. *Unesco Working Paper Series on Mobile Learning*. Paris, France: The United Nations Educational, Scientific and Cultural Organization.

Gay, L. R., Mills, G. E. and Airasian, P. (2006) *Educational research: Competencies for analysis and application*. Upper Saddle River, NJ: Pearson Merrill Prentice Hall.

Genat, B. (2009). Building emergent situated knowledges in participatory action research. *Action research*, 7(1), 101-115.

Gill, P. S., Kamath, A. and Gill, T. S. (2012). Distraction: an assessment of smartphone usage in health care work settings. *Risk management and healthcare policy*, 5, 105.

Gillenson, M. L., & Sherrell, D. L. (2002). Enticing online consumers: an extended technology acceptance perspective. *Information & management*,*39*(8), 705-719.

Gomez, R. G. (2012) Adherence to the Use of ICT for Classroom Instruction: Its Impact on Students' Learning. *IAMURE International Journal of Education*, 2 (1). Online at: http://dx.doi.org/10.7718/iamure.ije.v2i1.165, Published Online at IAMURE [accessed on 28/10/12].

Gorard, S. (2001) *Quantitative methods in educational research: The role of numbers made easy*. London: Continuum.

Gould, J. D., Conti, J. and Hovanyecz, T. (1983) Composing Letters With A Simulated Listening Typewriter, *Communications of the ACM*, 26(4), 295-308.

Graham, C. R., Woodfield, W. and Harrison, J. B. (2012) A Framework for Institutional Adoption and Implementation of Blended Learning in Higher Education. *The Internet and Higher Education*, doi: 10.1016/j.iheduc.2012.09.003.

Green, A. (2007). Management of security policies for mobile devices. *Proceedings of the annual conference on information security curriculum development*. doi:10.1145/1409908.1409933

Guest, G., MacQueen, K. M. and Namey, E. E. (2012). Introduction to applied thematic analysis. *Applied Thematic Analysis*, 3-18.

Guy, R. (Ed.). (2010). *Mobile learning: Pilot projects and initiatives*. Informing Science.

Hamilton, J. (2008) *Electronic Devices in Schools*. New Haven, CT: Thomson Gale.

Handy, J. H., Whiddett, R. and Hunter, I. (2001). A technology acceptance model for inter-organisational electronic medical records systems. *AJIS,* 9(1).

Harrington, R. A., & Enochs, L. G. (2009). Accounting for preservice teachers' constructivist learning environment experiences. *Learning Environments Research*, *12*(1), 45-65.

Harris, J., Mishra, P., & Koehler, M. (2009). Teachers' technological pedagogical content knowledge and learning activity types: Curriculum-based technology integration reframed. *Journal of Research on Technology in Education*, *41*(4), 393-416.

Hasson, F., Keeney, S. and McKenna, H. (2000). Research guidelines for the Delphi survey technique. *Journal of advanced nursing*, 32(4), 1008-1015.

Hatch, M. J. and Cunliffe, A. L. (2006), *Organization Theory* (2nd ed.), Oxford: Oxford University Press.

Herrington, J., Herrington, A., Mantei, J., Olney, I., & Ferry, B. (2009). Using mobile technologies to develop new ways of teaching and learning. Online at:

http://researchrepository.murdoch.edu.au/5227/1/Using_Mobile_technologies.pdf [Accessed on 22/10/2013].

Hidayat-ur-Rehman, I. (2014). Mobile Banking Adoption in Saudi Arabia. *Asian Journal of Research in Banking and Finance*, 4(10), 300-310.

Hinchcliffe, V. and Gavin, H. (2009). Social and virtual networks: Evaluating synchronous online interviewing using instant messenger. *The Qualitative Report*, 14(2), 318-340.

Hosmer, D. and Lemeshow, S. (2000) *Applied Logistic Regression* (Second Edition). New York: John Wiley & Sons, Inc.

Hu, L. and Webb, M. (2009). Integrating ICT to higher education in China: From the perspective of Activity Theory. *Education and Information Technologies*, 14(2), 143-161.

Huang, J., Lin, Y. and Chuang, S. (2007) Elucidating user behavior of mobile learning: A perspective of the extended technology acceptance model, *Electronic Library*, 25(5), 585-598. Online at: http://www.emeraldinsight.com/journals.htm?articleid=1634501&show=abstract [accessed on 01/08/12].

Huang, J. J., Yang, S. J., Huang, Y. M., & Hsiao, I. Y. (2010). Social Learning Networks: Build Mobile Learning Networks Based on Collaborative Services. *Educational Technology & Society*, *13*(3), 78-92.

Huang, R. T., Jang, S. J., Machtmes, K. and Deggs, D. (2012) Investigating the roles of perceived playfulness, resistance to change and self-management of learning in mobile English learning outcome. *British Journal of Educational Technology*, 43(6), 1004-15.

ICTs for Higher Education, Background paper from the Commonwealth of Learning, *UNESCO World Conference on Higher Education*, Paris, 5 to 8 July 2009, retrieved from: http://unesdoc.unesco.org/images/0018/001832/183207e.pdf [accessed on 30/10/12].

Ifenthaler, D. and Schweinbenz, V. (2013). The acceptance of Tablet-PCs in classroom instruction: The teachers' perspectives. *Computers in Human Behavior*, *29*(3), 525-534.

Im, I., Kim, Y., and Han, H. J. (2008). The effects of perceived risk and technology type on users' acceptance of technologies. *Information & Management*, 45(1), 1-9.

International Telecommunication Union (ITU) (2009) Measuring the Information Society – the ICT Development Index. Online at: http://www.itu.int/ITU-D/ict/publications/idi/material/2009/MIS2009_w5.pdf [accessed on 30/10/12].

International Telecommunication Union (ITU) (2011) Measuring the Information Society. Online at: http://www.itu.int/net/pressoffice/backgrounders/general/pdf/5.pdf [accessed on 30/10/12].

Jairak, K., Praneetpolgrang, P. and Mekhabunchakij, K. (2009) An Acceptance of Mobile Learning for Higher Education Students in Thailand. *The Sixth International Conference on eLearning for Knowledge-Based Society*, 17-18 December 2009, Thailand. Online at: http://www.ijcim.th.org/SpecialEditions/v17nSP3/36_Full_Kallaya%20Jairak_Online.pdf [accessed on 30/10/12].

Jeffrey, B. and Troman, G. (2004). Time for ethnography. *British Educational Research Journal*, 30(4), 535-548.

Jeng, Y.-L., Wu, T.-T., Huang, Y.-M., Tan, Q. and Yang, S. J. H. (2010). The Add-on Impact of Mobile Applications in Learning Strategies: A Review Study. *Educational Technology & Society*, 13 (3), 3–11.

Jiang, J. J., Hsu, M. K., Klein, G. and Lin, B. (2000) E-commerce user behavior model: an empirical study. *Human Systems Management*, 19(4), 265-76. Online at: http://elibrary.ru/item.asp?id=6042901 [accessed on 03/08/12].

Johnson, R. B. and Onwuegbuzie, A. J. (2004) Mixed Methods Research: A Research Paradigm Whose Time Has Come. *Educational Researcher*, 33(7), 14–26. Online at: http://edr.sagepub.com/content/33/7/14 [accessed on 12/11/12].

Jonassen, D. H., Howland, J., Moore, J., & Marra, R. M. (2002). Learning to solve problems with technology: A constructivist perspective.

Jones, B. F., Rasmussen, C. M. and Moffitt, M. C. (1997). *Real-life problem solving: A collaborative approach to interdisciplinary learning*. Washington D. C.: American Psychological Association.

Jones, C. and Healing, G. (2010). Net generation students: agency and choice and the new technologies. *Journal of Computer Assisted Learning*, 26(5), 344-356.

Jones, C., Ramanau, R., Cross, S. and Healing, G. (2010). Net generation or Digital Natives: Is there a distinct new generation entering university? *Computers & Education*, 54(3), 722-732.

Joo, Young Ju, Kyu Yon Lim, and Eugene Lim. "Investigating the structural relationship among perceived innovation attributes, intention to use and actual use of mobile learning in an online university in South Korea."*Australasian Journal of Educational Technology* 30.4 (2014).

Jumaat, N. F. and Tasir, Z. (2013). Integrating project based learning environment into the design and development of mobile apps for learning 2d-animation. *Procedia-Social and Behavioral Sciences*, 103, 526-533.

Katz-Sidlow, R. J., Ludwig, A., Miller, S. and Sidlow, R. (2012). Smartphone use during inpatient attending rounds: prevalence, patterns and potential for distraction. *Journal of Hospital Medicine*, 7(8), 595-599.

Kearney, M., Schuck, S., Burden, K., & Aubusson, P. (2012). Viewing mobile learning from a pedagogical perspective. *Research in learning technology*, *20*.

Kibelloh, M. & Bao, Y. (2014). Perceptions of International Female Students Towards E-learning in Resolving High Education and Family Role Strain. *Journal of Educational Computing Research*, 50(4).

Kim, H. W., & Kankanhalli, A. (2009). Investigating user resistance to information systems implementation: A status quo bias perspective. *Mis Quarterly*, 567-582.

Kim, S. H., Mims, C. and Holmes, K. P. (2006). An introduction to current trends and benefits of mobile wireless technology use in higher education. *AACE Journal*, 14(1), 77-100.

King Abdulaziz University (KAU) 2010, From: http://www.kau.edu.sa/Content.aspx?Site_ID=0&lng=EN&cid=2384 [accessed on 01/11/12].

King Abdulaziz University (2010). Online at: http://mlearning.kau.edu.sa/english/index.html [accessed on 01/11/12].

King Abdulaziz University (2011). Online at: http://ctld.kau.edu.sa/Content.aspx?Site_ID=322&lng=EN&cid=50749 [Accessed on 05/10/2015].

King Abdulaziz University (2012). Online at: http://it.kau.edu.sa/Content.aspx?Site_ID=223&lng=EN&cid=210145 [Accessed on 02/10/2015].

King Abdulaziz University (2015). Online at: http://www.kau.edu.sa/Pages-Vision-And-Objectives.aspx [accessed on 01/12/15].

King Abdulaziz University (2015). Online at: http://elearning.kau.edu.sa/Default.aspx?Site_ID=214&Lng=EN [Accessed on 02/10/2015].

Khan, S. H. (2012) Barriers to the introduction of ICT into education in developing countries: The example of Bangladesh. *International Journal of Instruction*, 5(2). Online at: http://www.e-iji.net/dosyalar/iji_2012_2_4.pdf [accessed on 23/10/12].

Koole, M. L. (2009). A model for framing mobile learning. *Mobile learning: Transforming the delivery of education and training*, 1(2), 25-47.

Kotrlik, J. W. K. J. W., & Higgins, C. C. H. C. C. (2001). Organizational research: Determining appropriate sample size in survey research appropriate sample size in survey research. *Information technology, learning, and performance journal*, *19*(1), 43.

Kukulska-Hulme, A. and Jones, C. (2011) The next generation: design and the infrastructure for learning in a mobile and networked world. In A. D. Olofsson and J Ola Lindberg (eds.), *Informed Design of Educational Technologies in Higher Education: Enhanced Learning and Teaching*. Hershey, PA: Information Science Reference (an Imprint of IGI Global), 57–78.

Kukulska-Hulme, A., Sharples, M., Milrad, M., Arnedillo-Sánchez, I. and Vavoula, G. (2009). Innovation in mobile learning: A European perspective. *International Journal of Mobile and Blended Learning*, 1(1), 13-35.

Kukulska-Hulme, A. and Shield, L. (2007). An overview of mobile assisted language learning: Can mobile devices support collaborative practice in speaking and listening? Online at: http://portal.acm.org/citation.cfm?id=1520087 Retrieved April, 15, 2008.

Kukulska-Hulme, A. and Shield, L. (2008). An overview of mobile assisted language learning: From content delivery to supported collaboration and interaction. *ReCALL*, 20(03), 271-289.

Lai, K. W. (2011) Digital technology and the culture of teaching and learning in higher education. *Australasian Journal of Educational Technology*, 27(8), 1263-1275.

Lai, K. W., Khaddage, F. and Knezek, G. (2011) Blending student technology experiences in formal and informal learning. *Journal of Computer Assisted Learning*, 29(5), 414-425.

Lam, J. and Duan, C. G. (2012) A Review of Mobile Learning Environment in Higher Education Sector of Hong Kong: Technological and Social Perspectives. *Hybrid Learning*, 7411, 165-173.

Laurillard, D. (2007). Pedagogical forms of mobile learning: framing research questions. Online at: http://eprints.ioe.ac.uk/627/1/Mobile_C6_Laurillard.pdf

Laurillard, D. (2013). *Rethinking university teaching: A conversational framework for the effective use of learning technologies*. Routledge.

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge university press.

Lee, C. G. (2012) Reconsidering Constructivism in Qualitative Research. *Educational Philosophy and Theory*, 44(4). Online at: http://onlinelibrary.wiley.com/doi/10.1111/j.1469-5812.2010.00720.x/pdf [accessed on 10/11/12].

Lee, S. G., Trimi, S., & Kim, C. (2013). The impact of cultural differences on technology adoption. *Journal of World Business*, *48*(1), 20-29.

Lee, Y. H., Hsieh, Y. C. and Chen, Y. H. (2013). An investigation of employees' use of e-learning systems: applying the technology acceptance model. *Behaviour & Information Technology*, 32(2), 173-189.

Leech, N. L. and Onwuegbuzie, A. J. (2009) A typology of mixed methods research designs. *Quality Quantity: International Journal of Methodology*, 43, 265–275.

Li, H. and Qiu, F. (2011). Analyzing theory characteristic and studying application mode about mobile learning. *International Conference on Electrical and Control Engineering (ICECE)* 2011, 6327-6330. IEEE.

Liaw, S. and Huang, H. (2012) A Case of Study of Investigating Users' Acceptance toward Mobile Learning. *Recent progress in data engineering and internet technology*, 157, 299-305.

Littlejohn, A., & Pegler, C. (2007). *Preparing for blended e-learning*. Routledge.

Liu, Y., Hu, F. and Li, H. (2009) Understanding learners' perspectives on m-learning: results from a survey. *Proceedings of the 2009 Euro American Conference on Telematics and Information Systems: New Opportunities to increase Digital Citizenship*.

Livingstone, S. (2012). Critical reflections on the benefits of ICT in education. *Oxford Review of Education,* 38:1, 9-24.

Lobe, B. and Vehovar, V. (2009) Towards a flexible online mixed method design with a feedback loop. *Quality Quantity: International Journal of Methodology*, 43:585-597.

Loch, K. D., Straub, D. W., & Kamel, S. (2003). Diffusing the Internet in the Arab world: The role of social norms and technological culturation. *Engineering Management, IEEE Transactions on*, *50*(1), 45-63.

Looi, C. K., Seow, P., Zhang, B., So, H. J., Chen, W. and Wong, L. H. (2010). Leveraging mobile technology for sustainable seamless learning: a research agenda. *British Journal of Educational Technology*, 41(2), 154-169.

Lopez-Fernandez, O. and Molina-Azorin, J. F. (2011) The use of mixed methods research in the field of behavioural sciences. *Quality Quantity: International Journal of Methodology*, 45, 1459-1472.

Lu, J., Yu, C., Liu, C. and Yao, J. (2003). Exploring factors associated with wireless Internet via mobile technology acceptance in Mainland China. *Communications of the Information Management Association*, 3, 101-120.

Lua, J., Yaob, J. E. and Yu, C. (2005) Personal innovativeness, social influences and adoption of wireless Internet services via mobile technology. *The Journal of Strategic Information Systems*, 14(3), 245-268.

Maag, M. (2006) iPod, uPod? An emerging mobile learning tool in nursing education and students' satisfaction. *Proceedings of the 23rd annual ascilite conference: Who's learning? Whose technology?* Online at: http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.130.4122&rep=rep1&type=pdf&embedded=true [accessed on 08/08/12].

Mac Callum, K., & Jeffrey, L. (2013). The influence of students' ICT skills and their adoption of mobile learning. *Australasian Journal of Educational Technology*, *29*(3), 303-314.

MacKeogh, K., and Fox, S. (2008) Strategies for embedding eLearning in traditional universities: drivers and barriers. In: *ECEL 2008 - The Proceedings of the 7th European Conference on e-Learning*, 6-7 November 2008, Agia Napa, Cyprus. Online at: http://doras.dcu.ie/2166/ [accessed on 22/09/12].

Mark D. Griffiths (2010) The Use of Online Methodologies in Data Collection for Gambling and Gaming Addictions. *International Journal of Mental Health and Addiction*, 8 (1), 8-20.

McConatha, D., Praul, M. and Lynch, M. J. (2008). Mobile Learning in Higher Education: An Empirical Assessment of a New Educational Tool. *Online Submission*, 7(3).

MCIT: Ministry of Communications and Information Technology (2012). Online at: http://www.mcit.gov.sa/english

MCIT: Ministry of Communications and Information Technology (2015). Online at: http://www.mcit.gov.sa/En/aboutmcit/sectordevelopment/pages/developmentstages.aspx

McLellan, R. (2009). Analysing Quantitative Data. *School-based Research: A Guide for Education Students*, 154.

Mediano, C.M., Mileva, N., Stoyanov, S., and Riopérez, N. (2009) Performance Support Systems (PSS) Methodology for Mobile Learning (m-learning). In A. Méndez-Vilas, A. Solano Martín, J. A. Mesa González and J. Mesa González (eds.), *Research, Reflections and Innovations in Integrating ICT in Education*. Badajoz, Spain: Formatex.

Mertens, D.M. (2012) What Comes First? The Paradigm or the Approach? *Journal of Mixed Methods Research*, 6: 255. http://mmr.sagepub.com/content/6/4/255.full.pdf+html

Messinger, J. (2012). *M-learning| An exploration of the attitudes and perceptions of high school students versus teachers regarding the current and future use of mobile devices for learning* (Doctoral dissertation, Pepperdine University). Online at: http://gradworks.umi.com/3487951.pdf [accessed on 18/10/12].

Miles, M. and Huberman, M. (1994). *Qualitative Data Analysis: a Sourcebook of New Methods*, 2nd edn. London: Sage.

Ministry of Economy and Planning, Kingdom of Saudi Arabia (2005). *The Eighth Development Plan* (1425/1426 – 1429/1430) A.H. (2005–2009) A.D. [verified 26 Jul 2012] http://www.saudi.gov.sa/wps/portal/!ut/p/c4/04_SB8K8xLLM9MSSzPy8xBz9CP0os3iTMGenYE8TIwN3X0cLA8_g4JDAwEB3Q3dvY_3g1Dz9gmxHRQB5Q87U/?tabid=nat&contnm=The%20Eighth%20Development%20Plan [accessed on 08/10/12].

Ministry of Education (2005). *The executive summary of the Ministry of Education ten-year plan.* Ministry of Education in Saudi Arabia. [verified 26 Jul 2012]

http://planipolis.iiep.unesco.org/upload/Saudi%20Arabia/Saudi%20Arabia%20Education%20Plan%20English%20summary.pdf [accessed on 08/10/12].

Ministry of Education (2012). Online at: https://www.google.co.uk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwisgqOOrPzKAhVEOBQKHb9yADQQFgggMAA&url=https%3A%2F%2Fhesc.moe.gov.sa%2FPages%2FDownloadvk.aspx%3Ft%3Du&usg=AFQjCNGW4pOjHocHNxsUjPuPTZnc74Rcrw&sig2=Yf_2GegTiqTUJus1DHVGIA [accessed on 08/10/12].

Ministry of Education, MOE (2014). Online at: http://www.moe.gov.sa/ar/HighEducation/Government-Universities/Pages/KAAU.aspx [accessed on 02/12/15].

Ministry of Education, MOE (2015). Online at: http://www.moe.gov.sa/ar/Ministry/Deputy-Ministry-for-Planning-and-Information-affairs/HESC/Ehsaat/Pages/default.aspx [Accessed on 07/05/2016].

Ministry of Education (2015). Online at: http://he.moe.gov.sa/ar/Ministry/Deputy-Ministry-for-Planning-and-Information-affairs/HESC/Ehsaat/Docs/b1434-1435-5-1.html [accessed on 30/11/2015].

Ministry of Finance (2015). Online at: https://www.mof.gov.sa/english/downloadscenter/pages/budget.aspx [accessed on 30/11/2015].

Minor, M. A., Smith, G. S. and Brashen, H. (2013). Cyberbullying in higher education. *Journal of Educational Research and Practice*, 3(1), 2.

Moeller, B. and Reitzes, T. (2011). Integrating technology with student-centered learning. A report to the Nellie Mae Education Foundation. *Education Development Center, Inc*.

Moore, G. and Benbasat, I. (1991) Development of an instrument to measure the perceptions of adopting new information technology innovation. *Information Systems Research*, 2, 192-222.

Moran, M., Hawkes, M. and El Gayar, O. (2010). Tablet personal computer integration in higher education: Applying the unified theory of acceptance and use technology model to understand supporting factors. *Journal of Educational Computing Research*, 42(1), 79-101.

Morris, N. P. (2010). Podcasts and mobile assessment enhance student learning experience and academic performance. *Bioscience education*, (16).

Morris, N., Ciccone, J. and Fisher, J. (2012). Potential roles for tablet devices in practical settings: Evidence from two case studies with biomedical science students. In *Proceedings of The Physiological Society*. The Physiological Society.

Morrow, B. (2012). BYOD security challenges: control and protect your most sensitive data. *Network Security*, (12), 5-8.

Motiwalla, L. F. (2007). Mobile learning: A framework and evaluation.*Computers & Education*, *49*(3), 581-596.

Moustafa, H., Marechal, N. and Zeadally, S. (2012). Mobile multimedia applications and their delivery. *IT Professional*, 14(5). IEEE.

Mueller, J. L., Wood, E., De Pasquale, D. and Cruikshank, R. (2012). Examining mobile technology in higher education: handheld devices in and out of the classroom. *International Journal of Higher Education*, 1(2), 43.

Munn, P. and Drever, E. (1990). *Using Questionnaires in Small-Scale Research. A Teachers' Guide*. Scotland, United Kingdom: Scottish Council for Research in Education.

Naismith, L., Lonsdale, P., Vavoula, G., Sharples, M. and Series, N. F. (2004). *Literature review in mobile technologies and learning* (Futurelab Series Report 11). Bristol: Futurelab.

Nassuora, A. B. (2012). Students acceptance of mobile learning for higher education in Saudi Arabia. *American Academic & Scholarly Research Journal*, *4*(2), 24-30.

Nickerson, R. S. (1981) Why interactive computer systems are sometimes not used by people who might benefit from them. *International Journal of Man-Machine Studies*, 15, 469-483.

Nicolas, C. L., Castillo, F. J. M., and Bouwman, H., (2008) An assessment of advanced mobile services acceptance: Contributions from TAM and diffusion theory models. *Information and Management*, 45, 359-364.

Nov, O., & Ye, C. (2008). Users' personality and perceived ease of use of digital libraries: The case for resistance to change. *Journal of the American Society for Information Science and Technology*, *59*(5), 845-851.

Obringer, S. J. and Coffey, K. (2007). Cell Phones in American High Schools: A National Survey. *Journal of Technology Studies*, 33(1), 41-47.

Onwu, G. O. and Ngamo, S. T. (2010) ICT Integration in Chemistry. Online at: http://oer.avu.org/handle/123456789/67 [accessed on 03/10/12].

Onwuegbuzie, A. J., Bustamante, R. M. and Nelson, J. A. (2010) Mixed Research as a Tool for Developing Quantitative Instruments. *Journal of Mixed Methods Research,* 4(1), 56–78. Online at: http://mmr.sagepub.com/content/4/1/56.full.pdf+html [accessed on 03/10/12].

Opdenakker, R. (2006). Advantages and disadvantages of four interview techniques in qualitative research. *In Forum Qualitative Sozialforschung/Forum: Qualitative Social Research*, 7(4).

Oppenheim, A. N. (2000). *Questionnaire design, interviewing and attitude measurement*. Continuum, London: Pinter.

Ozdemir, S. (2010). Supporting printed books with multimedia: A new way to use mobile technology for learning. *British Journal of Educational Technology*, 41(6), 35-38.

Pachler, N., Bachmair, B. and Cook, J. (2009). *Mobile learning: structures, agency, practices*. Springer Science & Business Media.

Pallant, J. (2013). *SPSS survival manual: A step by step guide to data analysis using SPSS*. McGraw-Hill International.

Palloff, R., and K. Pratt. (2001). Lessons From The Cyberspace Classroom. Paper presented at the *17th Annual Conference On Distance Teaching and Learning*. http://www.uwex.edu/disted/conference/Resource_library/proceedings/01_20.pdf

Park, N., Roman, R., Lee, S., and Chung, J. (2009) User acceptance of a digital library system in developing countries: An application of the Technology Acceptance Model. *International Journal of Information Management*, 29(3), 196–209.

Park, S. Y., Nam, M. W. and Cha, S. B. (2012). University students' behavioral intention to use mobile learning: Evaluating the technology acceptance model. *British Journal of Educational Technology*, 43(4), 592-605.

Patten, B., Sanchez, I. A. and Tangney, B. (2006). Designing collaborative, constructionist and contextual applications for handheld devices. *Computers & Education*, 46, 294-308.

Perkins, D. N. (1992). Technology meets constructivism: Do they make a marriage. *Constructivism and the technology of instruction: A conversation*, 45-55.

Piaget, J. (1977). *The development of thought: Equilibration of cognitive structures*. New York: Viking.

Phuangthong, D. and Malisawan, S. (2005) A study of behavioral intention for 3G mobile internet technology: Preliminary research on mobile learning. *Proceedings of the Second International Conference on eLearning for Knowledge-Based Society*, August 4-7, 2005, Bangkok, Thailand. Online at: http://219.243.15.8/webcourse2010/mobcom/qianyanjs/3G/A%20Study%20of%20Behavioral%20Intention%20for%203G%20Mobile%20Internet%20Technology%20Preliminary%20Research%20on%20Mobile%20Learning.pdf [accessed on 05/08/12].

Polit, D. F. & Hungler, B. P. (1991). *Nursing Research: Principles and Methods*. 4th ed. Philadelphia: J B Lippincott.

Powell, K. C., & Kalina, C. J. (2009). Cognitive and social constructivism: Developing tools for an effective classroom. *Education*, *130*(2), 241.

Prensky, M. (2001). Digital natives, digital immigrants part 2: Do they really think differently? *On the horizon*, 9(6), 1-6.

Prensky, M. (2009). H. sapiens digital: From digital immigrants and digital natives to digital wisdom. *Journal of Online Education*, 5(3), 1-9.

Punch, K. (2005). *Introduction to social research: Quantitative and qualitative approaches* (2nd ed.). London: Sage.

Pynoo, B., Devolder, P., Tondeur, J., Van Braak, J., Duyck, W. and Duyck, P. (2011). Predicting secondary school teachers' acceptance and use of a digital learning environment: A cross-sectional study. *Computers in Human Behavior*, 27 (1), 568-575.

Rahman, A. L. A., Jamaludin, A. and Mahmud, Z. (2011). Intention to use digital library based on modified UTAUT model: Perspectives of Malaysian postgraduate students. *World Academy of Science, Engineering and Technology*, 75, 116-122.

Rajasingham, L. (2010) *Critical factors for successful e-Learning: A case study of the Universitat Oberta de Catalunya*. E-Learn Centre, Internet Interdisciplinary Institute (IN3), Barcelona, Spain.

Rajasingham, L. (2011) Will Mobile Learning Bring a Paradigm Shift in Higher Education? *Education Research International*, 2011.

Ramsey, L. M. (2011). An investigation into the effectiveness of ICT in learning for a class of adult female students case study approach.

Rasimah, C. M., Ahmad, A. and Zaman, H. B. (2011) Evaluation of user acceptance of mixed reality technology. *Australasian Journal of Educational Technology*, 27(8), 1369-1387.

Raths, D. (2012). Are You Ready for BYOD: Advice from the trenches on how to prepare your wireless network for the bring-your-own-device movement. *The Journal (Technological Horizons In Education)*, 39(4), 28.

Rawashdeh, A. (2015). Adoption of 4G Mobile Services from the Female Student's Perspective: Case of Princess Nora University. *Malaysian Online Journal of Educational Technology*, 3(1), 13-27.

Rice, M. L., & Wilson, E. K. (1999). How technology aids constructivism in the social studies classroom. *The Social Studies*, *90*(1), 28-33.

Rogers, E. M. (2003) *Diffusion of innovations* (5th ed.). New York: Free Press (1st edition published 1962).

Rosario, V. C. (2012) *Generational differences in technology adoption in community colleges* (Doctoral dissertation, Drexel University). Online at:

http://dspace.library.drexel.edu/bitstream/1860/3811/1/Rosario_Victoria.pdf [accessed on 23/09/12].

SABQ. (2015). Online at: http://sabq.org/pR1aCd [accessed on 18/11/15].

Sahin, I. (2006) Detailed review of Rogers' diffusion of innovations theory and educational technology-related studies based on Rogers' theory. *The Turkish Online Journal of Educational Technology*, 5(2), 14-23. Retrieved from: http://www.tojet.net/articles/523.pdf [accessed on 03/08/12].

Salmons, J. (2014). *Qualitative Online Interviews: Strategies, Design, and Skills*. SAGE Publications.

Sánchez, J., & Olivares, R. (2011). Problem solving and collaboration using mobile serious games. *Computers & Education*, *57*(3), 1943-1952.

Sandelowski, M. (1986). The problem of rigor in qualitative research. *Advances in nursing science*, *8*(3), 27-37.

Sandelowski, M. (1993). Rigor or rigor mortis: The problem of rigor in qualitative research revisited. *Advances in nursing science*, 16(2), 1-8.

Sarkar, S. (2012) The Role of Information and Communication Technology (ICT) in Higher Education for the 21st Century. *The Science Probe*, 1(1), 30-40. Online at: http://thesciprobe.com/files/documents/6.-The-Role-of-ICT.pdf [last accessed on 20/10/12].

Schepersa, J. and Wetzels, M. (2007) A meta-analysis of the technology acceptance model: Investigating subjective norm and moderation effects. *Information & Management*, 44(1), 90-103. Retrieved from: http://www.sciencedirect.com/science/article/pii/S0378720606001170 [accessed on 06/08/12].

Schuck, S., Aubusson, P., Kearney, M. & Burden, K. (2013) Mobilising teacher education: a study of a professional learning community, Teacher Development, 17:1, 1-18. Online at: http://www.tandfonline.com/doi/pdf/10.1080/13664530.2012.752671 [accessed on 14/09/2015].

Scott, D. and Usher, R. (2011) *Researching education: data, methods and theory in educational enquiry*. London: Cassell.

Sellers, M., Wray, G., Meeker, N. and Moulton, S. (2009, October). Cyberbullying in Higher Education. In *World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education* 2009, 1, 2298-2303).

Sharples, M., Arnedillo-Sánchez, I., Milrad, M. and Vavoula, G. (2009). Mobile learning: Small devices, big issues. In N. Balacheff, S. Ludvigsen, T. Jong, A. Lazonder and S. Barnes (eds) *Technology-enhanced learning, part IV*, Springer Netherlands, pp. 233-249.

Sharples, M., Corlett, D. and Westmancott, O. (2002). The design and implementation of a mobile learning resource. Personal and Ubiquitous Computing, 6(3), 220-234.

Sharples, M., Taylor, J. and Vavoula, G. (2005). Towards a theory of mobile learning. *Proceedings of mLearn 2005*, *1*(1), 1-9.

Sharples M., Taylor J. and Vavoula G. (2007) A theory of learning for the mobile age. In R. Andrews and C. Haythornthwaite (eds) *The Sage handbook of e-learning research*, London: Sage Publications, pp. 221–247.

Sherif, M. (1936). *The psychology of social norms*. New York: Harpers.

Shirazi, F., Gholami, R. and Añón Higón, D. (2009). The impact of information and communication technology (ICT), education and regulation on economic freedom in Islamic Middle Eastern countries. *Information & Management*, 46(8), 426-433.

Son, H. A., Park, Y. A., Kim, C. A., Chou, J-S. (2012) Toward an understanding of construction professionals' acceptance of mobile computing devices in South Korea: An extension of the technology acceptance model. *Automation in Construction*, 28, 82-90. Retrieved from: http://www.scopus.com/record/display.url?origin=citedby&eid=2-s2.0-84865335585&noHighlight=false&relpos=0# [accessed on 11/08/12].

Srite, M. (2006) Culture as an explanation of technology acceptance differences: an empirical investigation of Chinese and US users. *Australasian Journal of Information Systems*, 14(1), 5-25.

Stake, R. E. (1995), *The Art of Case-study Research*. Thousand Oaks, CA: Sage.

Straub, E. T. (2009) Understanding technology adoption: Theory and future directions for informal learning. *Review of Educational Research*, 79(2), 625-649.

Straub, D., Keil, M. and Brenner, W. (1997). Testing the technology acceptance model across cultures: A three country study. *Information & management*, 33(1), 1-11.

Strauss, A. and Corbin, J. (1990). *Basics of qualitative research: Grounded theory procedures and techniques*. Newbury Park, CA: Sage Publications, Inc.

Stringer, E. (2007). *Action research: A handbook for practitioners (3rd edn)*. Thousand Oaks, CA: Sage.

Sung, Y. T., Hou, H. T., Liu, C. K., & Chang, K. E. (2010). Mobile guide system using problem-solving strategy for museum learning: a sequential learning behavioural pattern analysis. *Journal of computer assisted learning*,*26*(2), 106-115.

Sunstein, C. R. (1996). Social norms and social roles. *Columbia law review*, 903-968.

Taylor, J., Sharples, M., O'Malley, C., Vavoula, G., & Waycott, J. (2006). Towards a task model for mobile learning: a dialectical approach. *International Journal of Learning Technology*, *2*(2-3), 138-158.

Teddlie, C., & Tashakkori, A. (Eds.). (2009). *Foundations of mixed methods research: Integrating quantitative and qualitative approaches in the social and behavioral sciences*. Sage Publications Inc.

Teo, T., Lee, C. B. and Chai, C. S. (2008) Understanding pre-service teachers' computer attitudes: applying and extending the technology acceptance model. *Journal of Computer Assisted Learning*, 24(2), 128-143.

Teo, T. (2009). Modelling technology acceptance in education: A study of pre-service teachers. *Computers & Education*, 52(2), 302-312.

Terrell, S. R. (2012) Mixed-methods research methodologies. *The Qualitative Report*, 17 (1), 254-280. Online at: http://www.eric.ed.gov/PDFS/EJ973044.pdf [accessed on 11/11/12].

Teye, J. K. (2012) Benefits, challenges, and dynamism of positionalities associated with mixed methods research in developing countries: Evidence from Ghana. *Journal*

of Mixed Methods Research, 6: 379. http://mmr.sagepub.com/content/6/4/379.full.pdf+html [accessed on 25/10/12].

Thomas, T. D., Singh, L. and Gaffar, K. (2013). The utility of the UTAUT model in explaining mobile learning adoption in higher education in Guyana. *International Journal of Education and Development using Information and Communication Technology*, 9(3), 71.

Traxler, J. (2002). Evaluating m-learning. *Proceedings of MLEARN 2002: European Workshop on Mobile and Contextual Learning*, June 20-21 (pp. 63-64). Birmingham, UK: University of Birmingham.

Traxler, J. (2005) *Institutional issues: Embedding and supporting*. In A. Kukulska-Hulme and J. Traxler (Eds.) *Mobile Learning: A Handbook for Educators and Trainers*. London: Routledge, pp. 173-188.

Traxler, J. (2007). Defining, discussing, and evaluating mobile learning: The moving finger writes and having writ… . *International Review of Research in Open & Distance Learning*, 8(2), 1–12.

Traxler, J. and Bridges, N. (2004). Mobile Learning - The Ethical and Legal Challenges. Proceedings of *MLEARN 2004*, Bracciano, Italy, June 2004.

Traxler, J. & Dearden, P. (2005) The Potential for Using SMS to Support Learning and Organisation in Sub-Saharan Africa. *Proceedings of Development Studies Association conference*, Milton Keynes, September 2005.

Traxler, J. and Kukulska-Hulme, A. (2005). Mobile Learning in Developing Countries. In G. Chin (ed.) *A report commissioned by the Commonwealth of Learning*. Vancouver, BC: Commonwealth of Learning.

Traxler, J. and Kukulska-Hulme, A. (2005) Evaluating Mobile Learning: Reflections on Current Practice. *Proceedings of MLEARN 2005*, October 25-28, Cape Town, South Africa.

Trochim, W. M. (2006). Research methods knowledge base: sampling. *Web Centre for Social Research Methods.* Online at: http://www.socialresearchmethods.net/kb/sampling.php [Accessed on 29.06. 2015].

Trochim, W. M. and Donnelly, J. P. (2008). *Research methods knowledge base*. Atomic Dog/Cengage Learning.

UNDP in Saudi Arabia (2010) Online at: http://www.undp.org.sa/sa/ [accessed on 10/02/13].

UNESCO. (2012). Mobile Learning for Teachers in Asia. Online at: http://unesdoc.unesco.org/images/0021/002162/216284E.pdf [accessed on 04/07/12].

US News (2015). Online at: http://www.usnews.com/education/best-global-universities/search?country=saudi-arabia [accessed on 19/12/2015].

Uther, M., Zipitria, I., Uther, J. and Singh, P. (2005). Mobile Adaptive CALL (MAC): A case-study in developing a mobile learning application for speech/audio language training. In *IEEE International Workshop on Wireless and Mobile Technologies in Education, 2005. WMTE 2005, IEEE.*

Uzunboylu, H., Cavus, N., & Ercag, E. (2009). Using mobile learning to increase environmental awareness. *Computers & Education, 52*(2), 381-389.

Van Biljon, J. A. (2006). *A model for representing the motivational and cultural factors that influence mobile phone usage variety*. Unpublished Dissertation, University of South Africa.

Van Teijlingen, E., & Hundley, V. (2002). The importance of pilot studies. *Nursing Standard, 16(40), 33-36.*

Velautham, L. and Picard, M. Y. (2009). Collaborating equals: Engaging faculties through teaching-led research. *Journal of Academic Language and Learning*, 3(2), A130-A141.

Venkatesh, V. (2000) Determinants of perceived ease of use: Integrating control, intrinsic motivation, and emotion into the technology acceptance model. *Information Systems Research*, 11(4), 342-365. Online at: http://isr.journal.informs.org/content/11/4/342.short [accessed on 01/08/12].

Venkatesh, V. and Bala, H. (2008) Technology Acceptance Model 3 and a Research Agenda on Interventions. *Decision Sciences*, 39(2), 273–315.

Venkatesh, V., Morris, M., Davis, G. B. and Davis, F. D. (2003) User acceptance of information technology: Toward a unified view. *Management Information System Quarterly*, 27, 425-478.

Vogt, M., Schaffner, B., Ribar, A. and Chavez, R. (2010). The impact of podcasting on the learning and satisfaction of undergraduate nursing students. *Nurse Education in Practice*, 10(1), 38-42.

Vygotsky, L. (1986). *Thought and Language*. Cambridge, MA: MIT Press. (Original work published 1962).

Wallace, S., Clark, M. and White, J. (2012). 'It's on my iPhone': attitudes to the use of mobile computing devices in medical education, a mixed-methods study. *BMJ open*, 2(4).

Wang, C., Lo, S. and Fang, W. (2008) Extending the technology acceptance model to mobile telecommunication innovation: The existence of network externalities. *Journal of Consumer Behaviour*, 7 (2), 101–110. Online at: http://onlinelibrary.wiley.com/doi/10.1002/cb.240/abstract [accessed on 07/08/12].

Wang, Y. S., Wu, M. C. and Wang, H. Y. (2009). Investigating the determinants and age and gender differences in the acceptance of mobile learning. *British Journal of Educational Technology*, 40(1), 92-118.

Welsh, E. (2002). Dealing with data: Using NVivo in the qualitative data analysis process. In *Forum Qualitative Sozialforschung/Forum: Qualitative Social Research* 3(2).

Willis, G. B. (2005). *Cognitive interviewing: A tool for improving questionnaire design*. SAGE Publications, Incorporated.

Willson, M. (1997). Community in the abstract: a political and ethical dilemma?. *Virtual politics: Identity and community in cyberspace*, 145-62.

Wishart, J. and Green, D. (2010). Identifying emerging issues in mobile learning in higher and further education: A report to JISC. Online at: http://www.bristol.ac.uk/media-library/sites/education/migrated/documents/emergereport.pdf [Accessed on 21/09/2015].

World Economic Forum. (2015). Online at: http://reports.weforum.org/global-information-technology-report-2015/country-highlights/#saudi [Accessed on 22/09/2015].

Wua, J. and Wang, S. (2005) What drives mobile commerce?: An empirical evaluation of the revised technology acceptance model. *Information & Management*, 42(5), 719–729.

Yi, C. (2010). Research and implementation of multiserving-oriented mobile learning application based on eLML. In *International Conference on Computer Application and System Modeling (ICCASM)*, 2010 (Vol. 8, pp. V8-619). *IEEE.*

Yin, R. K. (2003a), *Case-study Research, Thousand Oaks*. London: Sage Publications.

Zahrani, M. S. (2010). The benefits and potential of innovative ubiquitous learning environments to enhance higher education infrastructure and student experiences in Saudi Arabia. *Journal of Applied Sciences (Faisalabad)*, 10(20), 2358-2368.

Zheng, Q., Zhao, H. and Zhang, W. (2012). A mobile learning system for supporting heterogeneous clients based on P2P live streaming. In *Distributed Smart Cameras (ICDSC), 2012 Sixth International Conference on* (pp. 1-6). *IEEE.*

Zhu, E. and Kaplan, M. (2002). Technology and Teaching. In W. J. McKeachie (ed), *McKeachie's Teaching Tips: Strategies, Research, And Theory For College And University Teachers*. Boston: Houghton Mifflin Company, pp. 204–224.

Zhu, Q., Hu, Y. and Guo, W. (2012). *Mobile learning in higher education: Students' acceptance of mobile learning in three top Chinese universities* (Doctoral dissertation, Jönköping University). Online at: http://hj.diva-portal.org/smash/record.jsf?pid=diva2:536882 [accessed on 22/10/12].

Zurita, G. and Nussbaum, M. (2004) A constructivist mobile learning environment supported by a wireless handheld network. *Journal of Computer Assisted Learning*, 20(4), 235–243.

Appendix 1

The Survey Before the Pilot Study

The Cover Page is the same before and after the pilot study

PART I: Demographic Information is the same before and after the pilot study

PART II: Attributes and obstacles impacting acceptance of mobile learning.

Below is a list of attributes that may impact on the acceptance of mobile learning. Please read each item carefully and indicate your perceptions about the influence of each item on the acceptance of mobile learning. Use the following scales to indicate your response (1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree) and tick the best response.

1. It is useful using mobile learning technology in my teaching.
2. Integrating mobile learning in my class improved (or would improve) students' learning and engagement.
3. Students in my classes engage in planned activities that involve the use of mobile devices.
4. Mobile learning provides opportunities for improving my learning and teaching practices.
5. I do not find it hard to use mobile learning technology in my teaching.
6. Dealing with mobile learning is clear and understandable.
7. It would be easy for me to become skilful at using mobile learning.
8. Learning to operate mobile learning is easy for me.
9. Using mobile learning technology requires an extra teaching effort.
10. I have the resource necessary to use mobile learning.
11. I have the knowledge necessary to use mobile learning.
12. I need someone to tell me the best way to use mobile learning inside and/or outside my classroom.
13. If I have problems and/or difficulties with using mobile learning in my teaching, there is a dedicated team at the university to help.
14. I can quickly adopt new technology in my teaching
15. The lack of ICT infrastructure in universities is a core challenge to integrating new technology into my teaching (note that ICT refers to the use of computers and the internet).
16. The lack of ICT infrastructure in universities makes me think of mobile devices as an alternative method of integrating technology into my teaching.
17. My university administration has encouraged the use of mobile learning.
18. Most people who are important to me think I should use mobile learning.

19. My colleagues who use mobile learning influenced me to use mobile learning too.
20. My students are willing to integrate mobile learning in class.
21. My students encourage me to use mobile learning.
22. The conservativeness of some Saudi universities on the use of mobile devices equipped with a camera negatively affects the use of mobile learning in my class.
23. If I accepted using mobile learning technology in my class, my students would not want to use it because of our Saudi conservative culture.
24. The (potential) misuse of mobile devices by my students prevents me from using mobile learning in my class.
25. The possibility of being imaged or videoed without knowledge by one of my students causes me to be worried about integrating mobile learning in the classroom.
26. The male faculty members find using mobile learning easier than female faculty members.
27. Some female students' families oppose their daughters using mobile devices within universities.
28. My students expect me to use mobile learning.
29. I am currently able to deliver a course (a single lesson or unit) using mobile device technology.
30. I am currently able to put some teaching materials (e.g. recorded lectures, assignments) online using mobile device technology.
31. I am currently able to accomplish some teaching functions (e.g. communication with my students, sending feedback) using mobile device technology.
32. I think my students are able to use mobile devices' tools (e.g. listening to the lectures, downloading and uploading materials, chat on-line, etc.).
33. I am aware of the benefits of implementing mobile learning for students on campus.
34. I am aware of the limitations of implementing mobile learning for students on campus.
35. I am willing to implement mobile technology in my teaching.
36. The traditional teaching methods (teacher-centred learning) are not fit for the requirements of the digital age.
37. The blending of traditional teaching methods (teacher-centred learning) and the use of mobile technology in educational environments is urgently needed to improve the quality of my teaching performance.
38. The blending of traditional teaching methods (teacher-centred learning) and the use of mobile technology in educational environment is urgently needed to improve my students' learning.

PART III: Behavioural Intention and Future Intention to Use Mobile Learning.

Also, it is the same before and after the pilot study.

The Open-ended Questions are the same before and after.

The Survey After the Pilot Study

Research Information Sheet for Participant's Consent in the Survey Phase

Dear Faculty member,

You are being invited to take part in a research project. Before you make a decision on this, it is important for you to understand why the research is being undertaken and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish, and feel free to ask us if there is anything that is not clear to you, or if you would like more information. Take time to decide whether or not you wish to take part. All the information that we collect about you during the course of the research will be kept strictly confidential and anonymous. You will not be identifiable in any reports or publications. Thank you for reading this.

I am a PhD candidate in the School of Education at the University of Leeds. The title of my PhD research is "Exploring the Influences on Faculty Members' Adoption of Mobile Technology for use in Mobile Learning at King Abdulaziz University, Saudi Arabia". The purpose of this questionnaire is to determine your perceptions of using mobile learning in student education at the King Abdulaziz University in Saudi Arabia. Mobile learning refers to the use of any handheld devices in learning and teaching, for example using a mobile device for uploading learning materials to the internet (so the students could download it and study wherever and whenever they want); using a digital voice recorder to record lectures (so your students can listen to them on their mobile device); or providing a mobile friendly quiz for students to complete.

This research aims to investigate *your* attitudes, thoughts and practices regarding integrating mobile learning, and will be used to create a base on which a general framework of the current and future use of m-learning in the Saudi HE system can be built. The results of this study will help to identify the key factors that affect faculty members' participation in m-learning in Saudi Arabia. The primary purpose of this study is to examine faculty perceptions about using m-learning as a face-to-face learning resource as this affects the dissemination of the m-learning culture in the

KAU. Particular focus will be given to factors relating to gender differences attitudes, Saudi university culture, and technology.

All King Abdulaziz University's faculties are being invited to take part in this research. I appreciate your participation if you choose to respond to a questionnaire or agree to an interview. However, taking part in the research is entirely voluntary and not participating or completing any part of the study will not negatively affect you in any way. The survey will take approximately 15 to 20 minutes to complete. All the information will be treated confidentially and anonymously and will be used for scientific research purposes only. I appreciate your participation, accuracy and honesty in answering the questions, and your time. Thank you for your cooperation. For further information, please go to the research blog at: http://lfarani.wordpress.com/2013/12/08/mobile-learning-concept/ or contact the researcher, Leena Alfarani, at ml09laka@leeds.ac.uk.

□ I have read and understand the information sheet for the above study and have had the opportunity to ask questions.

□ I understand that my participation is voluntary and that I am free to withdraw at any time, without giving a reason.

□ By clicking on the link below, I agree to take part in the above study.

Start the survey

PART I: Demographic Information

1. Gender ( ) Male ( ) Female
2. Age

( ) Under 29 ( ) 30 and less than 40 ( ) 40 and less than 50 ( ) 50 and less than 60 ( ) Over 60

3. Academic degree ( ) Bachelors ( ) Masters ( ) Doctorate
   ( ) Other …….
4. Position title

( ) Teacher assistant ( ) Lecturer ( ) Assistant professor ( ) Associate professor

( ) Full professor

5. Faculty which you work in?……
6. How many years teaching experience at university level do you have?

( ) Less than 5 years ( ) 5-9 years ( ) 10-14 years ( ) 15-19 years ( ) 20 years or over

7. What type of mobile device(s) do you have?.....
8. Please state your level of skill with using mobile devices (if you have not used a mobile device before, skip this section. You can choose more than one).

☐ To call and text

☐ To download and play games or applications from the web

☐ To take photos

☐ To send pictures or videos to other people

☐ To send or receive emails

☐ To access information or services on the internet

☐ To use social networking software on the internet (e.g. Facebook, Twitter, etc)

☐ To access information for teaching and learning purposes

☐ To create/edit audio and video

☐ Other……

PART II: Please choose the best statement to represent your current opinion of mobile learning (You can only choose one statement)

☐ I have not used mobile learning before and I will not use it in the future.

☐ I have not used mobile learning before and I will use it in the future.

☐ I use mobile learning and I will continue using mobile learning with my students in the future.

PART III: Attributes impacting on the acceptance of mobile learning.

Below is a list of attributes that may impact on the acceptance of mobile learning. Please read each item carefully and indicate your perception about the influence of each item on your acceptance of mobile learning. Use the following scales to indicate your response (1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree) and tick the best response.

It is useful using mobile learning technology in my teaching.

☐ Strongly Disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly Agree

Integrating mobile learning in my class improve students' learning and engagement.

☐ Strongly Disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly Agree

Students in my classes engage in planned activities that involve the use of mobile devices.

☐ Strongly Disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly Agree

Mobile learning provides opportunities for improving my learning and teaching practices.

☐ Strongly Disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly Agree

Dealing with mobile learning is clear and understandable.

☐ Strongly Disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly Agree

It would be easy for me to become skilful at using mobile learning.

☐ Strongly Disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly Agree

Learning to operate mobile learning is easy for me.

☐ Strongly Disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly Agree

I have the knowledge necessary to use mobile learning.

☐ Strongly Disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly Agree

I have the resources necessary to use mobile learning.

☐ Strongly Disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly Agree

If I have problems and/or difficulties with using mobile learning in my teaching, there is a dedicated team at the university to help.

☐ Strongly Disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly Agree

My university administration has encouraged the use of mobile learning.

☐ Strongly Disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly Agree

The lack of ICT infrastructure in Saudi's universities limits the integration of new technology into my teaching (note that ICT refers to the computer and the internet).

☐ Strongly Disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly Agree

The existence of some features on mobile devices (e.g. the Internet, WiFi, Apps, …etc) makes their integration into teaching and learning a suitable alternative to solve the lack of ICT infrastructure.

☐ Strongly Disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly Agree

My colleagues who use mobile learning influenced me to use mobile learning too.

☐ Strongly Disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly Agree

My students are willing to integrate mobile learning in class.

☐ Strongly Disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly Agree

I am currently able to use mobile devices in teaching and learning (e.g. uploading lectures, downloading and or uploading assignments, quizzes, communication with students, sending feedback).

☐ Strongly Disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly Agree

My students are able to use mobile device tools (e.g., Listening to lectures, downloading and uploading materials, chat on-line, etc.).

☐ Strongly Disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly Agree

PART IV: Challenges impacting the acceptance of mobile learning.

Below is a list of challenges that may impact on the acceptance of mobile learning. Please read each item carefully and indicate your perception about the influence of each item on the acceptance of mobile learning. Use the following scales to indicate your response (1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree) and tick the best response.

The conservativeness of some Saudi universities (e.g. staff, students) on the use of mobile devices equipped with a camera negatively affects the use of mobile learning in my class.

☐ Strongly Disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly Agree

The misuse of mobile devices by my students prevents me from using mobile learning in my class.

☐ Strongly Disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly Agree

The privacy of women in Saudi society limits their use of mobile learning technology inside the campus.

☐ Strongly Disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly Agree

Traditional teaching methods (teacher-centred learning) are not fit for the requirements of the digital age.

☐ Strongly Disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly Agree

The blending of traditional teaching methods (teacher-centred learning) with the use of mobile technology in educational environments is urgently needed to improve the quality of my teaching performance.

☐ Strongly Disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly Agree

The blending of traditional teaching methods (teacher-centred learning) with the use of mobile technology in educational environments is urgently needed to improve my students' learning.

☐ Strongly Disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly Agree

Faculty members clinging to traditional ways of teaching (teacher-centred learning) is an obstacle to the integration of mobile learning.

☐ Strongly Disagree ☐ Disagree ☐ Neutral ☐ Agree ☐ Strongly Agree

PART V: Please state your views (Optional)

Please give two primary reasons why you would use (or not to use) mobile learning in your teaching?

_____

_____

_____

Please specify, from your point of view, how you could be encouraged to implement mobile learning in your practice in the future?

_____

_____

_____

_____

Do you have any additional comments?

_____

_____

_____

If you want to participate in interview, please provide us with your email..

_____

_____

Thank you for completing the questionnaire

Appendix 2

Scenario of Integrated M-learning in Saudi Higher Education

After conducting the first part of this research – which explores the factors that influence the adoption of mobile learning approaches by KAU's teachers – the study will then develop a model of mobile learning that is appropriate for KAU, so that teachers at this university will be provided with support for successfully implementing this method of learning. This model will take the Saudi culture and norms into account, will seek to address the lack of student-centred learning in traditional Saudi universities, and will thus be at least partially utilisable by other Saudi universities as well.

Clearly, the scenarios and informative applications that mobile learning can provide will differ in relation to learners' subject disciplines. For example, educational activities for learners majoring in an arts subject such as history will substantially differ from those that can be offered to a group of students who are studying engineering. Each scenario will require strategies for meeting the respective goals involved, utilising pedagogical theories consistently to provide a meaningful use of mobile learning.

> *"Designing m-learning activities should theorise learning as a constructive and social process as well as consider learning as a personal and situated activity"* (Traxler, 2007).

The example below is designed for studying English. Each academic discipline has different needs and approaches, which will be taken into account when the next part of this research is conducted. The aims of the second part of the research are to bridge the gap between the traditional Saudi university and high-ranked universities around the world in successfully utilising mobile learning; to introduce a method into Saudi learning environments that students will enjoy learning with; and, most importantly, to refresh the pedagogical theories that have disappeared from traditional teaching practices, with collaborative and personal learning being the most crucial theories that this research intends to promote in mobile learning contexts.

The proposed mobile learning scenario

Mona is a tertiary professor who teaches English to first year undergraduates. She is responsible for two hours of face-to-face teaching per week. The classes are carried out using traditional teaching methods at the university in which the teacher explains the lesson and speaks throughout the lecture, with no participation or interaction between the students, the teacher and the educational content. However, this semester Mona plans to try blending a new lecture style with the traditional style.

Mona asks students to download Google Doc and WordPress onto their smart phones or onto any other mobile devices that they own so that they are accessible anywhere and anytime they want to use them. Mona knows that beginners on her course feel ashamed of their spoken English, but she reasons that mobile learning has the potential to encourage students who do not want to study a face-to-face learning environment for a variety of reasons, such as they want to undertake distance learning or they do not find the old-style university classroom set-up engaging (Kervin and Mantei, 2009).

At the start of the new course, Mona, as usual, begins to explain English language grammar using the blackboard and a PowerPoint presentation. She then distributes hand-outs to the students containing general introductory questions (e.g. introduce yourself, talk about your hobbies, places you like to visit, your language level, and so on), and then asks them to form themselves into groups of two or three students. Mobile learning clearly supports the transport and delivery of multimedia contents, discussions and channels of communication in real-time, synchronous and asynchronous methods, and the use of voice, text or multi-media (Moustafa et al., 2012).

Mona then asks her students to make use of portable devices, and X asks Z to use Z's device for recording Z's speach, so each one has a turn of voice recording. This enables each student to feel safe that no one can access her voice, as it is impermissible to record women's voices or to video them without their consent in Saudi culture. The teacher asks the students to listen to each other's recordings once they are finished, and then share the grammar mistakes they have noticed with the rest of the class. Furthermore, she asks them to synthesise their work and log on to the class Google Doc to annotate their reflections and note their thoughts on this topic. Mona suggests that using mobile learning inside the traditional classroom might provide an effective

way for the students to engage in teamwork and information-sharing between themselves. Patten, Sánchez, and Tangney (2006) stated that mobile learning has a massive potential to support collaborative, contextual, and constructivist learning principles.

After this, Mona displays all the students' mistakes using the projector in order to enable all the students to see and learn to understand the range and types of common grammatical errors, and to search for solutions that might limit their mistakes in the future. This method provides a good opportunity for students to demonstrate their own understanding and to learn from others. Mona asks the students to repeat these activities at their own convenience. Mobile Learning makes learning conceivable across time and contexts (Sharples et al., 2009). Mona believes that these mobile learning activities will encourage her students to become more responsible for managing their learning by involving them more in the learning process.

At the end of the lecture, Mona sets all the students an assignment to be submitted when the course finishes. She asks each student to create a weblog account on WordPress on their mobile devices and to keep a daily blog record of the work. When students have ideas, they can blog via their mobile phone and have the freedom of writing this at any time and place. Nardi et al. (2004) highlighted that blogging is a space for documenting life, developing a perception, providing channels for individual views and thinking by writing. Mobile bloggers expose the importance of a sense of ownership and willingness to employ mobile learning, form relations with other learners and to make their recordings openly available.

Mona asks the students to provide her with links to their blogs, which she can access through her Google account so that she can reach their work directly at anytime and anyplace. This also allows the students to receive immediate feedback on their work prior to and post submission.

In addition, Mona askes her students to search for useful learning sources during the semester and post them on Twitter. She proposes that if anyone has an idea for better ways to use mobile learning outside of the regular learning timetable and the physical classroom, they should post the idea to Google Doc to share it with other classmates, which will enable the students to improve their own learning experiences, and create a new atmosphere of interaction within the learning environment.

Mona sends students daily links of related academic materials and articles through Twitter and Google Doc, which can be accessed at any time and place. She also asks students to reflect on these resources and post their thoughts on their blogs.

Appendix 3

Research Information Sheet for Participants' Consent in the Interview

You are being invited to take part in a research project. Before you make a decision on this, it is important for you to understand why the research is being undertaken and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish, and feel free to ask us if there is anything that is not clear to you, or if you would like more information. Take time to decide whether or not you wish to take part. All the information that we collect about you during the course of the research will be kept strictly confidential and anonymous. You will not be identifiable in any reports or publications. Thank you for reading this.

I am a PhD candidate in the School of Education at the University of Leeds. The title of my PhD research is "Exploring the Influences on Faculty Members' Adoption of Mobile Technology for use in Mobile Learning at King Abdulaziz University, Saudi Arabia".

The purpose of this research is to reveal the factors affecting the adoption of mobile technology by faculty members in Saudi Arabia (SA) for use in teaching and learning. Mobile learning means "A learning model that provides ubiquitous, mobile, and anytime access to educational and university resources empowered by mobile technology in its connected or disconnected form" (Akour, 2009).

Faculty members' visions for utilising new technology (mobile learning) are an essential component in determining the success of the technological integration process in tertiary education. This research aims to investigate *your* attitudes, thoughts and practices regarding integrating mobile learning, and will be used to create a base on which a general framework of the current and future use of m-learning in the Saudi HE system can be built. The results of this study will help to identify the key factors that affect faculty members' participation in m-learning in Saudi Arabia. The primary purpose of this study is to examine faculty perceptions about using m-learning as a face-to-face learning resource as this affects the dissemination of the m-learning culture in the KAU. Particular focus will be given to factors relating to gender difference attitudes, Saudi university culture, and technology.

All King Abdulaziz University's faculties are being invited to take part in this research. I appreciate your participation if you agree to an interview. However, taking part in the research is entirely voluntary and not participating or completing any part of the study will not negatively affect you in any way. The interview will take approximately 45–60 minutes. For further information, please contact the researcher, Leena Alfarani, at ml09laka@leeds.ac.uk.

If the participants wish to have an audio recording, this audio will be used only for data analysis, and no other use will be made of it without the interviewee's written permission. Nobody outside the project will be allowed access to the original recording.

INTERVIEW CONSENT FORM

Exploring the Influences on Faculty Members' Adoption of Mobile Learning Technology at King Abdulaziz University, Saudi Arabia.

Leena Alfarani, PhD student at University of Leeds

Ml09laka@leeds.ac.uk

1.	I confirm that I have read and understood the information sheet for the above study and have had the opportunity to ask questions.	☐
2.	I understand that my participation is voluntary and that I am free to withdraw at any time, without giving reason.	☐
3.	I agree to take part in the above study.	☐
4.	I agree to the interview being audio recorded.	☐
6.	I agree to the use of anonymised quotes in publications.	☐

Name of Participant	Date	Signature
Name of Researcher	Date	Signature

Sample of the Invitation Email

Subject: Participating in an interview about mobile learning research

Dear Faculty,

Thank you for your participation in the questionnaire regarding the research entitled: "Exploring the Influences on Faculty Members' Adoption of Mobile Learning Technology at King Abdulaziz University, Saudi Arabia". And thank you for your willingness to participate in an online interview to provide the researcher with more details about your opinion on the use of mobile learning in teaching.

I would like to inform you that the interview will be online via the internet, and you need a computer or laptop, mic and headphone, and the internet, and I will send you the link to the online conversation to your e-mail. Kindly read the research information sheet and sign the consent forms. Could you please also tell me a convenient day and time for you to participate in the interview?

Kind Regards,
Leena Alfarani
PhD candidate at University of Leeds
Lecturer in King Abdulaziz University

Note: All data submitted through the interview will be kept confidential and used only for the purposes of scientific research. Thank you for your cooperation and I appreciate you and your valuable time.