

**Using Mobile Learning in Blended Learning Environments in Higher
Education:
Perceptions and Acceptance among Students and Lecturers at
Qassim University, Saudi Arabia**

**A thesis submitted for the degree of Doctor of
Philosophy by
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Abstract

In Saudi Arabia, learning methods, such as blended learning and mobile learning, have become more important than ever. However, to successfully implement such type of learning methods in higher education settings, determining the perceptions of students and lecturers is vital. Therefore, this qualitative study aims to determine students' and lecturers' understanding, acceptance, and barriers of using mobile learning in blended learning environments, using semi-structured interviews, open-ended surveys, and responses to the unified theory of acceptance and use of technology (UTAUT). Overall, 108 participants were included in the study, of which 12 students attended the interview and 24 lecturers and 72 students participated in the open-ended survey. The results show that performance expectancy, effort expectancy, habit, academic social influence, and conditions facilitating academics are the core determinants of behavioural intention, which have direct effects on the user behaviour of students and lecturers. To our knowledge, this is the first study that has investigated blended mobile learning acceptance in Saudi higher education settings. The findings can be generalised to the most of Saudi universities and some universities in the Arabian Gulf that exhibit the same conditions.

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Table of Contents

جدول المحتويات

List of Tables.....	10
List of Figures.....	11
Glossary	13
Definition of Key Terms.....	13
Chapter One: Introduction	15
Overview	15
Background.....	15
Definition of Blended Learning	17
Definitions of Mobile Learning.....	20
1- Defining Mobile Learning According to the Devices Used.....	21
2- Defining Mobile Learning According to the Learning Process	21
3- Definition of Mobile Learning According to the Learner's Mobility	22
Mobile Learning and E-learning	22
Similarities and Differences between Blended Learning and Mobile Learning.....	24
Problem Statement	25
Study Aims and Objectives	26
Purpose of the Study	26
Strengths and Limitations of the Study	27
Research Questions	29
Research Methodology	29
Reflexivity: Self and the Topic.....	30
Chapter Two: The Study's Context.....	32
Historical Overview	32
Saudi Arabia	33
Demographics of Saudi Arabia	35
Saudi Economy.....	35
Cultural Norms and Religious Influences	36
Education in Saudi Arabia.....	36
Higher Education in Saudi Arabia	37
Qassim University	37
Internet Usage in Saudi Arabia	38
Use of Mobile Devices in Saudi Arabia	39
Use of Technologies in Saudi Higher Education	41

Saudi Vision 2030	41
Chapter Three: Literature Review	43
Introduction	43
Understanding of Terms; Perceptions, Opinions, and Attitude.....	43
Part A: Blended Learning	45
Blended Learning Models	47
Approaches to Designing Blended Learning.....	49
Advantages and Benefits of Blended Learning.....	50
Blended Learning in Saudi Arabia	54
Challenges and Barriers of Blended Learning	55
Part B: Mobile Learning	56
Uses of Mobile Devices	57
Potential Uses, Advantages, and Benefits of Mobile Learning	58
Use of Mobile Apps.....	61
Mobile Learning in Higher Education	63
Perceptions of Mobile Learning in Saudi Arabia	65
Acceptance of Mobile Learning in Saudi Arabia	66
Mobile Learning and Collaborative Learning	69
Potential Challenges and Barriers of Mobile Learning.....	70
Part C: Using Mobile Devices in Blended Learning and Formal Education.....	74
Adapting to Mobile Learning in Blended Learning and Formal Education	76
Studies on Blended Mobile Learning	78
The Gap between Everyday Life and the Culture of the Classroom/Lecture Hall	86
Effect of Blended Mobile Learning on Teaching and Students	86
Potential Challenges and Barriers to the Adoption of Blended Mobile Learning	88
Theoretical Framework	88
1. Connectivism Theory	89
2. UTAUT	91
Summary.....	94
Chapter Four: Research Design and Methodology	95
Introduction	95
Research Paradigm: The Interpretive Paradigm	95
Research Approach: Qualitative Methods Research	98
Qualitative Design: Exploratory Case Study	99
Gaps and Research Questions.....	99
Research Design and Data Collection Methods	100

Translation of the Instrument	103
Validity	104
Trustworthiness, Credibility, and Transparency	104
Positionality Statement	106
Pilot Study	106
Strengths and Limitations of the Design	108
Population.....	108
Sampling.....	109
Participants Profile in Students' Interview	110
Student Participants' Profile Based on the Open-Ended Survey	112
Lecturer Participants' Profile Based on the Open-Ended Survey.....	114
Data Collection Procedures	115
Update from 2021	119
Chapter Five: Data from the Students' Semi-Structured Interviews	121
Overview	121
Chapter Introduction	121
1- Students' Jobs and Financial Income	122
2- Students' Understanding of the Terms	124
Students' Understanding of the Term 'Mobile Learning'	124
Students' Understanding of the Term 'Blended Learning'.....	125
Students' Understanding of the Term 'Blended Mobile Learning'	126
3- Confidence in Using Mobile Devices for Learning	127
4- Student Acceptance	128
Facilitating Conditions.....	129
Performance Expectations.....	132
Effort Expectancy.....	136
Habit	139
Academic Social Influence.....	148
Behavioural Intention	149
Educational Experiences	152
5- Important Features of Mobile Devices that Suit Blended Mobile Learning ...	158
6- Barriers to Adopting Blended Mobile Learning	159
Summary.....	161
Chapter Six: Analysis and Findings of Data from the Students' Open-Ended Survey	163
Introduction	163
1- Jobs and Financial Income.....	163

2-	Student Perceptions	164
	Students' Understanding of the Term 'Mobile Learning'	164
	Students' Understanding of the Term 'Blended Learning'	165
	Students' Understanding of the Term 'Blended Mobile Learning'	165
3-	Confidence in Using Mobile Devices for Learning	166
4-	Student Acceptance	166
	Facilitating Conditions.....	166
	Access to the Internet	166
	Academic Facilitating Conditions	169
	Performance Expectancy.....	172
	Effort expectancy	179
	Habit	181
	Educational Experiences	187
	Students Using Mobile Devices for Academic Purposes	187
	Social Influence	191
	Academic Social Influence.....	191
	Behavioural Intention	191
-5	Important Features of Mobile Devices to Suit Blended Mobile Learning ...	194
6-	Barriers to Adopting Blended Mobile Learning	196
	Summary.....	196
Chapter Seven: Data from the Lecturers' Open-Ended Survey.....		198
	Introduction	198
-1	Lecturers' Profiles.....	198
2-	Lecturers' Perceptions.....	199
3-	Lecturers' Confidence in Using Mobile Devices for Learning	201
4-	Lecturers' Acceptance of Blended Mobile Learning	201
	Facilitating Conditions.....	201
	Academic Facilitating Conditions	202
	Performance Expectancy.....	203
	Effort Expectancy.....	206
	Habit	208
	Total Time Spent and Duration of Mobile Use Daily	208
	Behavioural Intuition	211
	Educational Experiences	213
	Social Influence	215
	Academic Social Influence.....	216
-5	Important Features of Mobile Devices to Suit Blended Mobile Learning	218

6- Barriers to the Adoption of Blended Mobile Learning	219
Summary.....	221
Chapter Eight: Discussion	222
1- Perceptions	222
Understanding Blended Learning, Mobile Learning, and Blended Mobile Learning.....	222
2- Confidence	226
3- Acceptance.....	226
Facilitating Conditions and Academics Facilitating Conditions	226
Performance Expectancy.....	229
Effort Expectancy.....	232
Habit	234
Behavioural Intention	237
Experiences of Blended Mobile Learning	238
Social Influence and Academic Social Influence	240
4- Important Features of Mobile Devices to Suit Blended Mobile Learning	241
5- Barriers and Challenges Faced in the Implementation of Blended Mobile Learning.....	243
Update from 2021	246
Summary.....	246
Chapter Nine: Conclusion, Implications, Limitations, and Recommendations	248
Conclusion	248
Validity and Methods.....	256
Limitations.....	257
Challenges in this Study	258
Contribution of Research	258
Implications for Other Stakeholders	260
Suggestions	260
Future Research	260
Appendices	262
Appendix 1: Approval Letter for Research Ethics from Brunel University, London	262
Appendix 2: Form Soliciting Agreement to Participate	263
Appendix 3: Participants' Personal Information Form	265
Appendix 4: Student Interview Guide	266
Appendix 5: Sample Student Interview Transcript	267
Appendix 6: Students who participated in the Survey	271

Appendix 7: Student Survey Questionnaire	274
Appendix 8: Lecturer Survey Questionnaire.....	280
Appendix 9: A sample of a coded sheet.....	284
References.....	285

List of Tables

<i>Table 1 Main challenges associated with this study</i>	74
<i>Table 2 Results of keyword search per year</i>	78
<i>Table 3 Characteristics of interpretivist paradigm</i>	98
<i>Table 4 Participants in students' interview</i>	111
<i>Table 5 Lecturer information</i>	114
<i>Table 6 Students' jobs</i>	163
<i>Table 7 Results of the question on participants' use of the university's app</i>	169
<i>Table 8 Students' thoughts about the ways of using mobile devices in education</i>	173
<i>Table 9 Students' responses to questions about the effects of mobile learning on their academic achievement</i>	177
<i>Table 10 Students' responses to questions about the effects of blended mobile learning on their motivation</i> .	177
<i>Table 11 Results of the survey on the apps most commonly used by the students</i>	182
<i>Table 12 Data on subjects of personal interest searched for using mobile devices</i>	186
<i>Table 13 Data on the students' preferred apps for contacting their tutors and peers</i>	190
<i>Table 14 Students' responses to the question about the barriers to adopting mobile learning</i>	196
<i>Table 15 Main types of mobile device owned by the lecturers</i>	202
<i>Table 16 Participants' responses to statements about the effect of blended mobile learning on the students' academic achievement</i>	204
<i>Table 17 Effects of mobile learning on students' motivation</i>	204
<i>Table 18 Tools used by the lecturers to communicate with their students</i>	215
<i>Table 19 Barriers of using blended mobile learning</i>	219

List of Figures

Figure 1 E-Learning, blended learning, and mobile learning	24
Figure 2 Blended mobile learning and other types of learning styles	24
Figure 3 Position of the Arabian Gulf on the world map	32
Figure 4 Map of Saudi Arabia Figure 5 Position of Saudi Arabia in the Arabian Gulf.....	33
Figure 6 Population of Saudi Arabia concerning age distribution, gender, and nationality.....	35
Figure 7 Mobile broadband subscriptions per 100 inhabitants in Saudi Arabia (Communications and Information Technology Commission, 2018)	39
Figure 8 Use of internet and mobile devices in Saudi Arabia in 2019.....	41
Figure 9 Students' profile in Saudi Vision 2030.....	42
Figure 10 Main components of blended learning	45
Figure 11 Models of blended learning	47
Figure 12 Rotation Model.....	48
Figure 13 Blended mobile learning model (Khaddage & Zhou, 2009)	80
Figure 14 UTAUT Model by Venkatesh et al. (2003).....	91
Figure 15 The used model is a modified acceptance framework that is based on UTAUT	92
Figure 16 Interconnection of worldviews, design, and research methods (Creswell, 2014)	96
Figure 17 Age range of participants	112
Figure 18 Participants' current level of study	113
Figure 19 Proportion of female-to-male participants.....	115
Figure 20 A modified acceptance framework based on UTAUT	129
Figure 21 Type of mobile devices owned by the students.....	131
Figure 22 Effects of blended mobile learning on students' motivations.....	135
Figure 23 Effects of using blended mobile learning in the classroom	137
Figure 24 Apps used most by the students	144
Figure 25 Types of information searched for by students on their mobile devices.....	145
Figure 26 Students learning for personal interest using a mobile device	148
Figure 27 Students' positive and negative feelings about the educational use of apps	152
Figure 28 Most commonly used mobile apps for communication	157
Figure 29 Important mobile device features that are useful in blended mobile learning environments.....	159
Figure 30 Barriers that can affect blended mobile learning	161
Figure 31 Types of mobile device used by the participants	167
Figure 32 Pie chart of students' laptop or PC ownership.....	168
Figure 33 Hours spent on using mobile devices daily	168
Figure 34 Students' agreement with statements about teachers encouraging them to use mobile devices for learning inside lecture halls	169
Figure 35 There are facilities for using mobile devices in lecture halls	171
Figure 36 The university encourages students to use new technology.....	172
Figure 37 Mobile devices are very useful inside the lecture halls	175
Figure 38 Mobile devices increase student collaboration.....	175
Figure 39 Mobile devices are very important to help me in my studies	176
Figure 40 Mobile learning is used to increase students' creativity.....	178
Figure 41 Using social media apps for communication with lecturers brings students closer to their lecturers in a meaningful way	178
Figure 42 Mobile devices make me learn faster	179
Figure 43 Mobile devices enable students to access a huge amount of data on any subject	180
Figure 44 Blended mobile learning helps solve the problem of individual differences between students.....	180
Figure 45 Average no. of hours spent using mobile devices daily.....	181
Figure 46 If I want to use e-mail, I prefer to use a mobile device rather than a computer.....	184
Figure 47 Students using mobile devices to research a topic of personal interest	184
Figure 48 I have the skills to use my mobile device for education	191
Figure 49 participants' feelings about using mobile devices for academic purposes with the instructor's guidance	192
Figure 50 I like the use of mobile devices in education.....	193

Figure 51 I keep some study materials in my mobile device.....	194
Figure 52 Academic level attained by and current professional position of lecturers	198
Figure 53 Lecturers' teaching experience by the number of years	199
Figure 54 Lecturer's responses to statements about the university's encouragement of technology use	202
Figure 55 Lecturers' responses to statements about the facilities for mobile devices to be used in lecture halls	203
Figure 56 Lecturers' responses to statements about the students were encouraged to use their mobile devices for learning purposes.....	203
Figure 57 Blended mobile learning helps solve individual differences amongst students	205
Figure 58 Blended mobile learning would increase students' creativity.....	205
Figure 59 Blended mobile learning enables the user to access a huge amount of data on many subjects	206
Figure 60 Using social networking apps to share the lecture with the students in a meaningful way.....	206
Figure 61 Blended mobile learning will make students learning faster	207
Figure 62 Average number of hours spent daily by lecturers, using their mobile devices	208
Figure 63 Types of information generally searched for by the lecturers using their mobile devices	209
Figure 64 Lecturers using their mobile devices to learn something of personal interest.....	210
Figure 65 Frequency of lecturers' mobile communication with other universities in the KSA	216
Figure 66 Frequency of lecturers' mobile communication with other universities abroad.....	217
Figure 66 Frequency of lecturers' mobile communication with current students.....	217
Figure 67 Frequency of lecturers' communication with former students	217
Figure 68 Frequency of discussion via mobile communication with colleagues and peers	218
Figure 69 Frequency of using mobile communication to establish relationships with academics for professional purposes	218
Figure 70 Lecturers need to develop some skills of use mobile devices for education	220
Figure 71 Students need more skills to use mobile devices for education	221
Figure 72 Learning types.....	225

Glossary

Definition of Key Terms

Numerous terms are used in this study, of which key terminologies are listed and defined here to promote the clarity of the thesis.

Face-to-face (F2F) learning: This learning takes place through traditional direct communication between instructors and students, usually in a classroom context within formal education (Baragash & Al-Samarraie, 2018). In this study, F2F learning is referred to as traditional learning.

Formal learning: This learning occurs when the learner is physically located in formal education environments, such as classroom settings (Lai, Khaddage & Knezek, 2013), which are usually led by instructors.

Informal learning: This learning occurs outside formal classroom settings via self-directed, self-monitored, and self-managed activities (Lai et al., 2013).

Web-based learning: This learning is undertaken using web browsers to access online content via networks, such as through public internet or private intranet systems (Baragash et al., 2018).

Electronic learning (E-learning): This learning happens via electronic devices, especially computers with an internet connection, which are used to access information and knowledge (Rahamat, Shah, Din & Aziz, 2017).

Online learning: This learning is based on technologically mediated interactions with learning content between students and instructors (Boelens, Van Laer, De Wever & Elen, 2015).

Blended learning: This learning involves the integration of the traditional F2F learning and e-learning. This is also called hybrid learning or mixed-mode learning (O'Byrne & Pytash, 2015).

Mobile learning: This learning involves the use of handheld mobile devices as the sole or dominant technology in gaining education (Traxler, 2005).

Mobile devices: They include smart mobile phones; MP3/MP4 players, such as iPods and personal digital assistants (PDAs); mini-notebooks or netbooks; handheld geographical positioning system devices; handheld gaming devices, such as Sony PSP; and tablets (Hashemi, Azizinezhad & Najafi, 2011). These devices are designed to run various kinds of software, allowing users to download mobile apps (Al-Hunaiyyan, Al-Sharhan & Alhajri, 2017).

PDAs: They, also known as handheld PCs, are pocket-sized mobile computers (Houser, Thornton & Kluge, 2002).

Digital natives: These are learners born after 1980 who grew up in the digital age (Almutairy, Davies & Dimitriadi, 2015).

Blended mobile learning: This learning involves the use of mobile devices for education anytime and anywhere combined with F2F interaction with the teachers.

Chapter One: Introduction

Overview

This study aims to determine the perspectives on and acceptance of using mobile learning in blended learning environments in higher education amongst students and lecturers at Qassim University, Buraydah, Saudi Arabia. This chapter introduces the topic of discussion, with backgrounds and definitions of blended and mobile learning. Furthermore, the chapter highlights the research purpose, problem statement, aims and objectives, limitations, and most importantly, research questions of the study. Finally, this chapter also presents an outline of the thesis itself and its key components.

Background

The issue of better-quality teaching in higher education is a global concern. Many new instructional strategies have been incorporated into teaching and learning to increase flexibility and enhance pedagogy in higher education (Alebaikan & Troudi, 2010). In the process of developing new educational processes, universities have realised the importance of using new technologies and teaching methods to meet the needs of the current technological revolution. Contemporary student cohorts were born in a digital age. Therefore, formulating teaching and learning methods to suit their requirements and preferences will inevitably lead to changes and varieties in teaching and learning approaches (Moreira, Pereira, Durão & Ferreira, 2018). Moreover, rapid developments in higher education policy in Saudi Arabia encourage all universities to move forward with the international trend.

Blended learning is an approach to education that combines face-to-face (F2F) classroom learning with electronic learning (e-learning) methods, wherein the physical presence of the teacher, students, and technological devices are all required. There is generally a rapid development in the provision of e-learning and blended learning in institutes of higher education across the world. Several studies have reported that blended learning is more effective than traditional systems or e-learning methods used alone. For instance, Chen and Yao (2016) have concluded that a blended learning environment is a more effective alternative to the F2F classroom or e-learning applied separately. Owston (2013), however, points out that while blended learning has a

distinctly positive effect on higher education learning, many institutions have yet to implement it successfully.

Technology has impacted every sector, including education. Outside formal education, learning takes place informally through mobile technologies (Subhash & Bapurao, 2015). The use of mobile devices is noticeably ubiquitous, showing how important they have become for everyday life. The biggest proportion of mobile device ownership is evident in the age group 18–29 years—the age of many university students all across the world (Crompton & Burke, 2018). Moreover, the use of mobile devices is widespread across both the developed and developing world, with most people owning one or more device, such as an iPhone, iPad, iPod, Android smartphone, tablet, book reader, wearable computer (smartwatch), or personal digital assistant (PDA). These devices are usually portable computers that are small enough to fit in a pocket or the palm. Typically, they have a touchscreen, displaying keyboards and buttons on a flat screen or may come with a small separate keyboard. These devices can connect to wireless networks and control or interconnect with other devices, such as televisions, computers, and car speakers. Furthermore, many mobile devices share common features such as data storage, memory, coloured display technologies, cameras, digital media players, and a global positioning system.

A mobile device user can, therefore, make phone calls and send messages, apart from having access to unlimited data and information, images, and audio–visual material. Moreover, the user can share data using apps, emails, and browsers. In brief, mobile devices have multiple uses and benefits, because they are designed to be ‘smart’—automatically adjusting to the user’s needs and circumstances. There is no doubt that a growing number of people around the world use these mobile devices to access their email, check the latest news, read articles, obtain weather information, pay bills, shop online, play games, interact with others on social networking sites, and send text messages. Thus, mobile devices help users to perform many tasks that can be approached via multiple avenues with just a few simple clicks or by touching a screen. What is more? They enable access at any time and from anywhere (Bhovi, 2018). Consequently, this leads to significant changes in various aspects of people’s lives as well as across cultures and societies, besides education.

Mobile learning is a form of e-learning that enables new learning methods using mobile device technologies and wireless networks. Recently, the use of mobile devices for education has become more widespread. It has been the essence of expansion and vibrant streams of research referred to as 'mobile learning' (Pimmer, Mateescu & Gröhbiel, 2016). The use of mobile devices—with their in-built technologies and social media applications (apps)—creates dynamic new learning environments, which demand further research (Hosseini, Kaed & Alhazmi, 2015). Indeed, mobile learning can provide significant educational opportunities for individual learners, who may not be able to remain stationary at their desks or computers all day, but who wish to learn and engage with activities whilst on the move. Therefore, mobile technological devices provide options for learning while 'on the go'. Increasing the use of mobile devices leads to greater 'mobility of knowledge', thus enabling active engagement outside the classroom with the information gained, including information gained through informal learning, such as social media interactions (Demouy, Jones, Kan, Kukulska-Hulme & Eardley, 2016).

Recently, the coronavirus disease 2019 (COVID-19) pandemic has immensely impacted the education sector, and many educational issues around the world will need to be addressed, including Saudi Arabia. The pandemic has opened new horizons in education, raising the need for change from traditional to more appropriate and modern educational methods. To ensure social distancing and safety of students, universities—like all higher educational institutes—have adopted online learning, e-learning, and blended learning. In addition to rapid progress and globalisation, adopting these methods of education due to COVID-19 has transformed the world into a well-connected village despite the temporal or spatial dimensions. Hence, this study is more important and contributes effectively during unprecedented times such as the current pandemic.

Definition of Blended Learning

According to Stefanou (2013), blended learning is a popular concept in higher education and most teachers proudly declare implementing blended learning methods in their teaching activities. Blended learning is commonly defined as a combination of F2F classroom and online activities. Various blended learning strategies and methods have been implemented in institutions and universities. Furthermore, according to

Sharpe, Benfield, Roberts, and Francis (2006), the use of blended learning is on the rise amongst higher education institutions in the UK. The above authors reported a significant recent increase in the conversion of traditional F2F and online instructions into blended learning courses.

According to Graham (2006), blended learning is a system that combines two learning methods: traditional instruction and computer-mediated instruction. The author further stated that although the future of learning is unpredictable, the use of blended learning systems will become increasingly common, to the extent that blended learning will merely be called 'learning' without the need to qualify it as 'blended'. In contrast, however, Poon (2014) claims that many researchers have formulated varying definitions of blended learning, and these are only linked by a general theme, namely the combination of physical and virtual environments. For example, Sharpe et al. (2006) lists eight possibilities for blended learning:

1. Learning delivered via various modes within traditional F2F and online education
2. Combined web-based technologies
3. Chronologically synchronous interventions
4. Virtual and classroom practice-based learning
5. Multi-disciplinary roles
6. Range of pedagogical approaches
7. Focus on diverse aims
8. Directive instructors with autonomous or self-directed learners

Although there is no single agreed definition of blended learning (Alammary et al., 2014), the most common definition for this term is that it is a blend of offline and online learning that occurs in an educational context, distinguishable as deliberately blended classroom- and online-based interventions to encourage and support learning (Boelens et al., 2015). Boelens et al. (2015) further add that blended learning does not include any learning that occurs either purely online or exclusively within the classroom in an educational context. Matukhin and Zhitkova (2015) define blended learning as a combination of F2F and internet-based learning, especially using internet tools that enable cooperative learning known as Web 2.0 or 'second generation' internet. The authors add that blended learning is also a type of e-learning or its extension, with additional F2F communication between the teacher and student and between the

students themselves. In contrast, Driscoll (2002) identifies four different aspects of blended learning:

1. Combination or integration of web-based technology to achieve an educational objective, including live virtual classes, audio or video streaming, and self-paced learning
2. Integration of different pedagogical approaches (for example, constructivism and cognitivism) to create an ideal educational outcome, either with or without instructional technology
3. Integration of instructional technology with F2F class-based learning led by the instructor, which may include audio and videotapes, video games, web-based programmes, and films
4. Combination or integration of actual job tasks with instructional technology to produce a compatible working and learning effect

These four definitions highlight the unexploited potential of blended learning (Driscoll, 2002).

Meanwhile, Singh (2003) also states that blended learning is simply a case of joining traditional class-based learning with e-learning activities. The author also identifies five concepts of blended learning:

1. Blending of offline and online learning with online forms (such as internet or intranet) and offline forms (such as traditional instructor-led classroom learning)
2. Blending of self-paced, live, and collaborative learning, where solitary learning occurs according to the learner's own pace, blended with collaboration, communication, and sharing between a large number of peers to build knowledge
3. Blending of structured and unstructured learning, which focusses on building knowledge through meetings, conversations, and email (Singh (2003) explains that not all forms of learning involve a formal programme, organised sequentially like chapters in a textbook.)
4. Blending of custom content with off-the-shelf content, where a combination of generic and customised content is deployed, bringing together live classroom or online experiences and content customised to meet an organisation's unique requirements

5. Blending of learning, practice, and support for performance, which supplements knowledge and then puts it into practice in a simulation model before it is applied to job tasks

The combination of traditional class-based learning with online learning is the most popular concept of blended learning. Blended learning is widely known to replace some aspects of traditional F2F courses with e-learning activities (Owston, 2013). Nevertheless, blended learning approaches include synchronous and asynchronous forms of learning (Singh, 2003). Therefore, this form of learning can bring together all the advantages of traditional F2F and online learning. In this study, the definition used for blended learning is the integration of F2F traditional learning and e-learning for education synchronously or asynchronously.

Online learning has been motivated by the desire to take advantage of new technologies in the digital age. Nevertheless, some disadvantages have been noted in its application. For example, it can reduce social communication amongst students and between students and educators. Conversely, F2F traditional learning is not flexible enough to offer lessons that every student can follow according to their preferred pace or learning style. Blended learning, therefore, offers a combination of two learning modes, where the strengths and weaknesses of each are covered. In fact, blended learning has significant advantages, such as the provision of environments where educators can enhance their students' academic achievement and skills. Means, Toyama, Murphy, and Baki (2013) conclude that blended learning is more effective than instructions delivered either entirely online or F2F; they found that the learning outcomes in such environments are statistically greater than in online or F2F learning used alone. Powell, Watson, Staley, Patrick, Horn, Fetzer, Hibbard, Oglesby, and Verma (2015) also report that blended learning allows students to choose the appropriate time, methods, and place for their learning, thereby enabling them to become self-directed learners.

Definitions of Mobile Learning

The term 'mobile learning' has many definitions. As previously stated, mobile use is ubiquitous, and therefore, anyone with a mobile device and an internet connection will have some experience of mobile learning in some way. The vast amount of data and

resources that are accessible at any time and from anywhere is impressive, but there is no single general definition of mobile learning agreed to in the research community, whether in terms of focus on learners' mobile learning ability or on the mobile learning devices themselves (Alharbi & Drew, 2014).

Some researchers define mobile learning according to the portable devices and other mobile hardware used, while others are more concerned with the learner's actual mobility while learning. There are also researchers who are more interested in the learning process itself and the acquisition of knowledge in any location and at any time. El-Hussein and Cronje (2010) identify three main components of mobile learning: mobility of the technologies, mobility of the learner, and mobility of the learning. Similarly, Al-Emran, Elsherif and Shaalan (2016) list four main components: mobility of the learning process, mobility of the learners, mobility of the educators and mobility of the technology. Currently, all these aspects may be considered important (Hashemi et al., 2011), and therefore, it is worth considering them individually in the following sections.

1- Defining Mobile Learning According to the Devices Used

Ng (2001) states that any research on mobile learning should start with a description of its relationship to mobile devices. Currently, digital technologies are becoming more portable, more economical to produce, and more widely distributed (Demouy et al., 2016). Li and Qiu (2011) comment that mobile learning is the result of the availability of mobile devices, greater communication, internet technology, and everyday learning. Meanwhile, Traxler (2007) defines mobile learning as an educational activity using wireless mobile devices and technologies, suggesting that mobile learning can take place by searching for and gaining knowledge via mobile devices (Crompton et al., 2018).

2- Defining Mobile Learning According to the Learning Process

A personal preference for mobile learning is defined as follows:

Any sort of learning that happens when the learner is not at a fixed, predetermined location, or learning that happens when the learner takes advantage of the learning opportunities offered by mobile technologies.

(O'Malley, Vavoula, Glew, Taylor, Sharples, Lefrere, Lonsdale, Naismith & Waycott, 2005)

Quinn (2000) describes mobile learning as a form of learning that takes place when the learner is not at a predetermined place or learning that uses mobile technologies. Similarly, Geddes (2004) defines mobile learning as learning that uses mobile technology to gain information, knowledge, and skills anywhere and at any time, resulting in changes being made to a learner's behaviour. Furthermore, Keegan (2005) states that mobile learning should focus on mobility by deploying portable devices, such as smartphones, PDAs, and palmtops.

3- Definition of Mobile Learning According to the Learner's Mobility

In general, mobile learning refers to learning while on the move (Behera, 2013). Kukulska-Hulme and Traxler (2005) clarify this further by explaining that mobile learning allows individuals to perform educational activities without the need to be in a specific location. This is enabled by using portable, lightweight mobile devices. The authors further add that mobile devices have affected teaching, learning, and the connection between formal and informal learning.

Mobile Learning and E-learning

E-learning employs information and communications technology (ICT) to improve the quality and quantity of education that meets the requirements of students in the digital era (Altieri, 2017). Since the late 1980s or early 1990s, when e-learning first emerged, new technology devices have been developed and used increasingly, becoming ubiquitous amongst students to the extent that they can be integrated into education (Hashmi et al., 2011). Definitions of mobile learning (also known as m-learning) vary across the literature, depending on the respective mobile device and application used, mobility of the learners, presence of learning 'on the go', and relationship between mobile learning and e-learning. Previous research has considered mobile learning an extension of e-learning, with wireless mobile devices and communication technologies being used for learning and training (Pinkwart, Hoppe, Milrad & Perez, 2003; Doneva, Kasakliev & Totkov, 2007; Trifonova & Ronchetti, 2003). While e-learning focusses on the use of computers to access information, mobile learning concerns the use of portable mobile devices for the same purpose (Rahamat et al., 2017). Mobile learning

is often considered one of the e-learning models, where knowledge, learning experiences, attitudes, and skills can be acquired via mobile technologies (Hamidi & Chavoshi, 2018).

Mobile learning is similar to e-learning and distance education in some ways, but it depends on learning across contexts via mobile devices, particularly wireless mobile devices, which facilitate learning in any location and at any time (Georgieva, Smrikarov & Georgiev, 2005). Therefore, mobile learning is considered a new concept in modern education and an extension of e-learning, bringing with it the advantages of flexibility and mobility (Badwelan, Drew & Bahaddad, 2016).

Conversely, one of the differences between e-learning and mobile learning is that the former depends on distance learning, while the latter depends on situated learning (Behera, 2013). Moreover, unlike e-learning, mobile learning has certain additional features such as mobility, ability to change locations, immediate interaction, and small-scale wireless devices. Finally, e-learning occurs in a specific location and timeframe, while mobile learning can occur at anytime and anywhere (Traxler, 2007). The latter can also take place in combination with F2F interaction amongst learners and between learners and teachers (Behera, 2013).

Similarities and Differences between Blended Learning and Mobile Learning

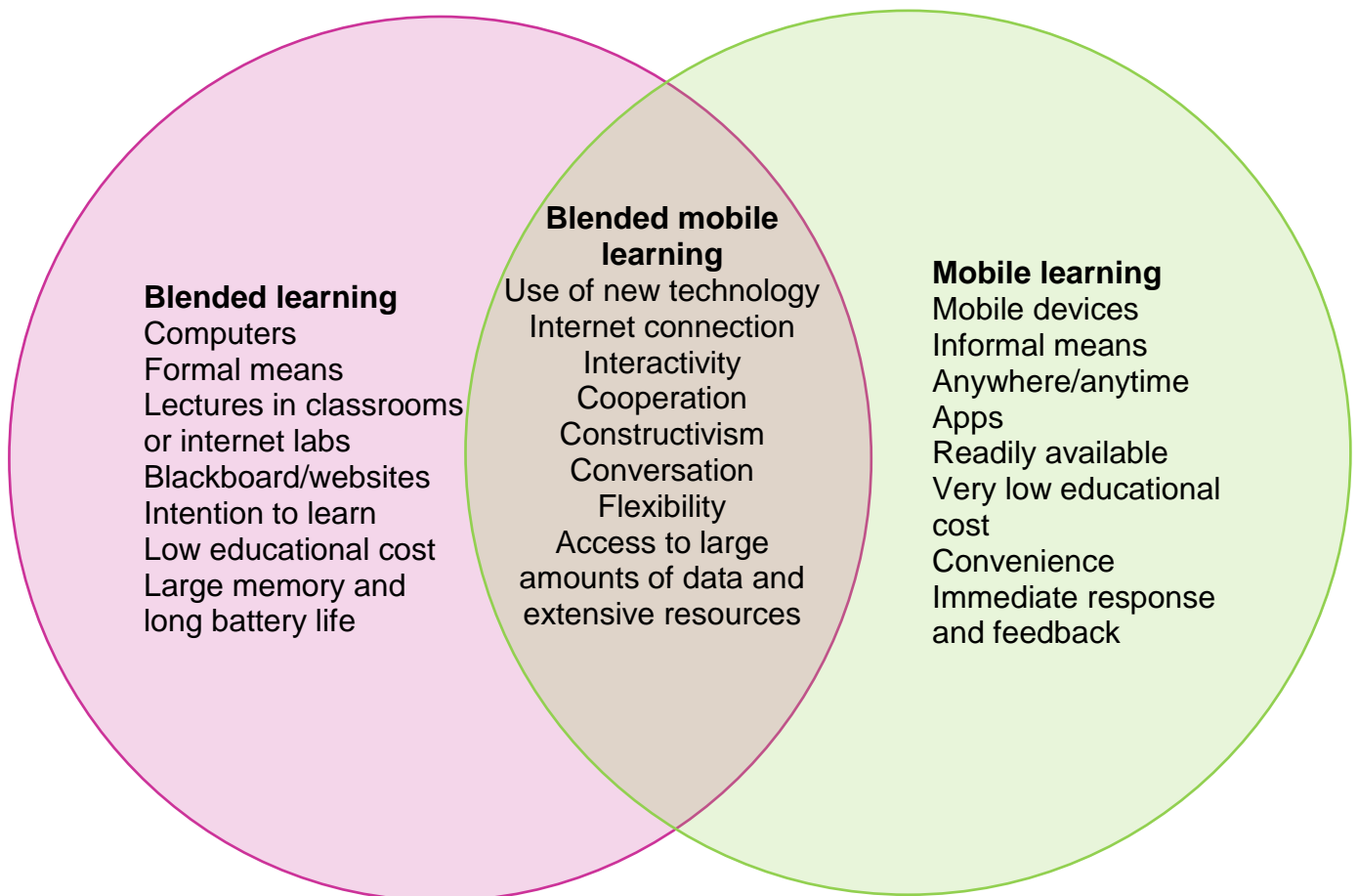


Figure 1 E-Learning, blended learning, and mobile learning

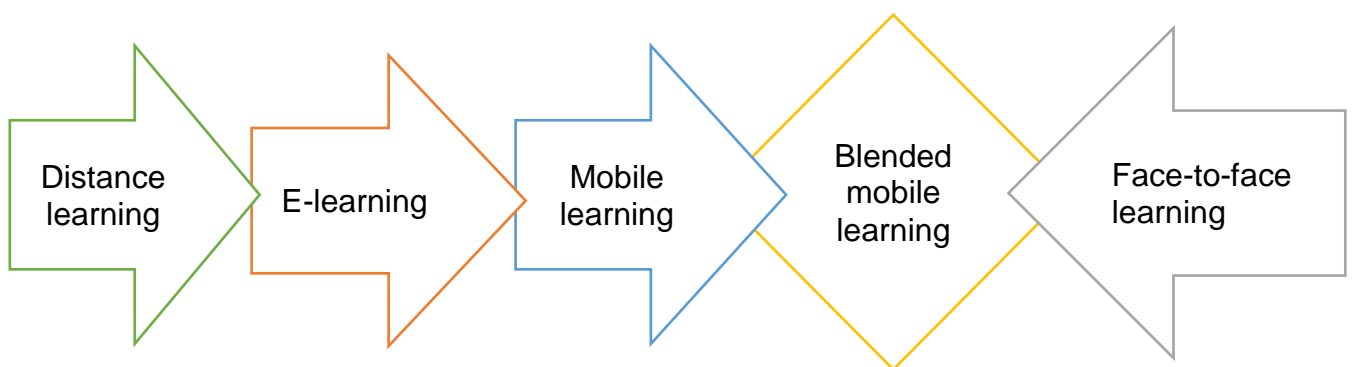


Figure 2 Blended mobile learning and other types of learning styles

In this study, mobile learning is defined as the use of mobile devices for gaining knowledge anywhere and anytime; blended learning refers to the combination of traditional learning and e-learning methods in education; and blended mobile learning is the combination of mobile devices for education and guidance from the teachers.

Problem Statement

The increasing development of new mobile devices and their associated technologies facilitate various aspects of our everyday life. For this reason and partly attributed to their low costs and portability, mobile devices are extremely popular and most people own one at least. By using these small devices with an internet connection, various tasks can be accomplished, such as staying updated with the latest news, checking weather forecasts, accessing one's bank account, transferring money, making purchases, obtaining or sharing information, paying bills, controlling other devices, checking road traffic, attending video calls, engaging in conversations, following social media, and accessing entertainment. Therefore, researchers have started to consider implementing the concept of mobile devices in education to enable better teaching and learning processes, which are in line with the demands of the digital era. However, there is a general lack of available systematic knowledge, although over 20 years have passed since the advent of mobile learning research (Pimmer et al., 2016). Moreover, more research concerning blended learning at an institutional level is warranted to encourage higher education institutes to strategically adopt blended learning approaches (Graham, Woodfield & Harrison, 2013).

Although Saudi Arabia's Ministry of Education stipulated the integration of new technology into universities, mobile learning in education remains a new technology merely in its developmental stage, and there is limited research concerning this topic (Al Harthi, 2018). Governments of the Arabian Gulf countries encouraged the adoption of mobile learning in formal education. However, little is known about the attitudes of students and educators towards this form of learning. Consequently, there is a need to investigate students' and teachers' perspectives and acceptance of mobile learning as an emerging educational approach in Arab universities (Alfarani, 2014; Al-Emran et al., 2016). I believe that all students should know how to and be able to use new technologies, such as mobile devices, as tools for acquiring, researching, managing, accessing, organising, and assessing information in higher education institutes. However, most research in this area has addressed informal self-education via mobile learning. Mobile learning in Saudi Arabia is usually associated with students learning outside the classroom (Albedah & Lee, 2017). Moreover, few studies have been conducted in Saudi Arabia on 'technology acceptance' in higher education, especially

mobile learning acceptance from lecturers' perspective (Alharbi & Lally, 2017). Nevertheless, I believe there is a need to implement mobile devices effectively in Saudi classrooms, although most educators are quite apprehensive about using mobile devices in this context. This can be attributed to the notion that students may use them for purposes other than learning and, therefore, get distracted from 'proper' learning. This apprehension has resulted in decisions of prohibiting the use of mobile devices in some Saudi universities.

There is limited academic research investigating mobile learning in higher education in Saudi Arabia. This study, therefore, intends to address the above-mentioned knowledge gap and aims to encourage students to use their own mobile devices as educational tools inside as well as outside the classroom. In addition, the study aims to establish the potential of using mobile learning and technology in blended learning in higher education. In this thesis, I will call it blended mobile learning, although this research focusses on the integration of mobile learning in blended learning environments for teaching in higher education.

Study Aims and Objectives

1. To explore students' perceptions of using mobile learning in formal education, especially blended learning environments
2. To explore lecturers' perceptions of using mobile learning in blended learning environments
3. To identify the effect of mobile learning implementation in blended learning from students' perspectives
4. To identify how mobile learning broadens the range of possible teaching and learning strategies in blended learning environments from the perspective of lecturers
5. To explore or identify the challenges or barriers associated with using mobile learning in blended learning environments

Purpose of the Study

This study aims to investigate lecturers' and students' perspectives on and acceptance of using mobile learning in blended learning environments and determine ways in which they can use mobile devices inside and outside the classroom. This study also

aims to identify the effect of mobile devices on the learning process that can lead to changes in the educational environment. In this study, the researcher attempts to construct a knowledge system with a greater understanding and clearer perspective of the uses, effects, and benefits of mobile devices and blended mobile learning technology. This is because students' perceptions of their learning experience may be positively correlated with their learning outcomes and engagement with the learning process (Ellis & Han, 2018).

In particular, this study examines students' behavioural intention towards using mobile learning, before determining whether there is any variation in age, gender, or department. Furthermore, the study also evaluates students' attitudes, opinions, and motivation to interact in new experiences, while assessing their performance. Moreover, this study will explain the effect of using a blended learning programme as a teaching method and learning strategy from the lecturers' perspective.

Before considering or exploring mobile learning in higher education, students' intentions towards the use of mobile learning should be investigated (Cheon, Lee, Crooks & Song, 2012). Determining students' intention and willingness to adopt mobile learning is a critical step towards guaranteeing the success of adopting or implementing mobile learning in higher education (Lai, Wang & Lei, 2012). Moreover, investigating students' and educators' perceptions and acceptance of mobile learning is important for distinguishing its strengths and weaknesses, so as to be able to develop an appropriate technology infrastructure (Al-Emran et al., 2016). Therefore, identifying or understanding factors that can possibly affect students' acceptance of this form of learning is a vital step to ensure the successful implementation of mobile learning in higher education (Almaiah, Alamri & Al-Rahmi, 2019).

Many previous studies that endeavoured to understand learners' behavioural intention of using mobile learning in Saudi education appear to suffer from certain shortcomings (Alharbi et al., 2014), which will be discussed in detail in Chapter 3. In light of this, the limitations of this current study are also discussed below.

Strengths and Limitations of the Study

This study contributes to the existing knowledge of using mobile learning in blended learning theoretically to enable the implementation of this type of learning in the formal

educational experience. There are limited studies about using mobile learning in blended learning in Saudi education, and the existing literature focusses on either blended learning or mobile learning (Queiri & Madbouly, 2018). This study focusses on both the lecturers' and students' perceptions. In addition to this, it is noteworthy that previous studies have not determined the vital factors that could play a significant role on students' and lecturers' acceptance of this topic. Thus, this study tries to fill that gap using the unified theory of acceptance and use of technology (UTAUT) to investigate the main antecedents of this acceptance in depth in Saudi higher education. Further, this study aims to assist educators to better understand the lecturers' and students' perceptions and help them design meaningful education techniques using helpful and modern technologies that suit this era. Furthermore, the findings of this study aim to help and encourage education policymakers as well as universities to incorporate blended mobile learning in a way that enhances the process of learning and teaching.

This study, however, is restricted to only one university in Saudi Arabia, namely Qassim University, therefore imposing a geographical limitation. The participants are exclusively adult college students, who have experience in searching for information and are familiar with technology. To attend such courses, the students must have at least one mobile device with an internet connection. However, given the similarity between most universities in Saudi Arabia in terms of the education process and culture, the results of this study can be generalised to most universities nationwide and perhaps even to universities in similar cultures elsewhere in the world.

Research Questions

The following are the two key research questions of this study:

1. What are the students' and lecturers' perceptions and understanding of using mobile learning in blended learning in Saudi Arabia?
2. What are the factors that affect students' and lecturers' acceptance of using mobile learning in blended learning in Saudi Arabia?

The following are the sub-questions of this study:

1. What is the students' and lecturers' acceptance towards using mobile learning in blended learning?
2. How do students and lecturers use mobile technologies for education and learning?
3. What do students and lecturers know and understand about blended mobile learning?
4. How does the use of mobile learning affect higher education?
5. What are students' and lecturers' opinions and feelings towards using mobile learning in blended learning?
6. What challenges and barriers affect the implementation of using mobile learning in a blended learning environment?

Research Methodology

A qualitative methodology was selected in this study to gain an in-depth understanding of students' opinions, thoughts, and attitudes in relation to the use of mobile learning in a blended learning environment. As a result, qualitative research methods were chosen in the form of semi-structured interviews and open-ended surveys. Meanwhile, the target sample consisted exclusively of students, of which 12 students participated in semi-structured interviews and 72 students completed an open-ended survey. The initial results revealed the important role of lecturers in preventing the integration of blended mobile learning in higher education. For this reason, the research was extended to include 24 lecturers' acceptance and perceptions in relation to the use of mobile learning in a blended learning environment.

Reflexivity: Self and the Topic

I graduated with a bachelor's degree in computer science from Qassim University, Buraydah, Saudi Arabia, in 2010. During that period, I undertook several courses in computer labs with no internet connection. At the university, all files, images, videos, and presentations were stored in and transported to CDs. Consequently, data loss was inevitable and quite easy. Further, data could not be reviewed outside the computer labs. Moreover, although computer science students were permitted to bring their laptops, they were not allowed to use them outside these labs due to the assumption that internet and computers would be used mainly for entertainment and not for education. In addition, lecturers at the university did not share their email addresses with the students; hence, besides F2F meetings, there was no other means of communication. Therefore, for any clarification, including permissions needed for reasons unrelated to the lecture, waiting for long periods in front of the lecturers' offices was the norm, which was laborious and a waste of time for all concerned. However, all students outside the university would use email, email groups, and Dropbox sites to share course materials and help each other in addition to making phone calls and sending text messages to ask each other questions or respond to other students' queries.

After graduation, I became a part-time lecturer at the university's computer science department, where I worked for 18 months. I taught my students in a manner similar to that of my former lecturers, who were also my colleagues at that point. I went on to pursue my master's degree in Educational Technology at the University of Northern Colorado. There, I appreciated how my lecturers could be reached by email, and I even used an email app to receive and send emails. Moreover, I took a mobile learning course, which was very interesting, and this experience of using technology to support education drove me to think about adopting mobile technologies in education as a lecturer myself. From 2014 to 2015, I worked as a lecturer in an educational technology department, where I implemented mobile apps and technologies with my students, including Twitter, to make announcements and share public information about, for example, the cancellation of lectures or reminders about tests and exam times. In addition, I used the Ask app, which I found very useful. Through Ask, my students could ask me any question and I would respond to them

all. Furthermore, I assigned my students a mind map exercise, but since not all of them owned a computer, they asked me if they could do it using apps on their mobile phones. I was pleased that they were using their mobile devices to support their study tasks. In fact, their use of mobile devices and corresponding apps made teaching and communication with them much easier. However, most of my fellow lecturers at that time were unfamiliar with what I was doing. Nonetheless, it should be noted that I had no clear plan of getting my students to use their mobile devices as a tool to support their education, but it was rather encouraging to see them use it for communication.

In brief, my personal experience drove me to discover a gap between students' everyday lives and their lives within the educational institute. For example, even though the students generally enjoyed using their mobile devices to facilitate their personal lives, they were not allowed to use them in lecture halls. Therefore, in this study, I attempted to gather students' and lecturers' opinions, perceptions, and levels of acceptance and readiness to use blended mobile learning through the adoption of mobile devices in formal education.

Chapter Two: The Study's Context

To better understand the background of this study, this chapter highlights some general, yet important, information about the Kingdom of Saudi Arabia (KSA) and Buraydah specifically, the region where Qassim University is located. Arabian Gulf countries share similar cultures, religion, language, and economic features. Therefore, to an extent, this study may be generalised beyond Saudi Arabia. In addition, to better clarify the content of this study, this chapter provides a comprehensive view of the KSA, along with the country's historical overview, demographic profile, description of the economy, cultural norms, religious influences, education system, internet usage, and the Vision 2030 development policy.

Historical Overview



Figure 3 Position of the Arabian Gulf on the world map

In ancient times, traders from the East and the West converged at the Arabian Peninsula (Yaghi, 2018). As a result, civilisations flourished with great diversity of science and knowledge across the Arabian Peninsula—some leaving behind monuments and edifices (Yaghi, 2018). For millenniums, people in this part of the world exchanged skills and knowledge, ranging from poetry to arithmetic. With time, Prophet Muhammad's influence grew, unifying the Arabian Peninsula, disseminating the Islamic religion, and exhorting its adherents to pursue knowledge and learning. Subsequently, the holy cities of Makkah and Medina became the centres of knowledge and education (Hakeem, 2012). In 622 A.D., education was gradually introduced in mosques, often through what were referred to as 'learning circles' (Tlass, 2014). Tlass

(2014) states that within these learning circles, there was no difference between the rich and the poor; all the learners sat in a circle around a teacher who taught religion, language, science, and general knowledge about life. Moreover, this learning was available to both men and women, either free of charge or at a low cost to enable complete accessibility to all. Apart from these learning circles, there were *katateeb*, also known as ‘writers’ (Tlass, 2014).

The two sources of learning mentioned above became central to the education accessed by most children in the Muslim world, and the practices were spread piecemeal to neighbouring countries as far as Persia in the east and Morocco and Andalusia in the west. Over time, more affluent members of the society were able to pay scientists, often called ‘preceptors’, to provide private tuitions to their children (Tlass, 2014), although the mosques continued to play a leading role in education. In fact, for nearly five centuries, it could be said that mosques were the only places that offered education. Small schools were eventually established, and education began to be established beyond mosques. Nevertheless, these schools were extremely few in number and limited to specific areas. Therefore, in 1926, after King Abdulaziz took over Najd and Hijaz, he made it a priority to build schools and set up an education system in the country. The first school was consequently established in Makkah (Al-Omari, 2019).

Saudi Arabia



Figure 4 Map of Saudi Arabia



Figure 5 Position of Saudi Arabia in the Arabian Gulf

The KSA was founded in 1932 and officially named the Kingdom of Saudi Arabia (Sultan & Seale, 1995). It is an absolute monarchy, currently headed by King Salman bin Abdulaziz, the seventh King of Saudi Arabia. The KSA is the biggest country in the Middle East. It is located in south-west Asia and covers the largest part of the Arabian Peninsula. As of 2017, the KSA has an estimated surface area of 2,149,690 square kilometres and a population of 32,552,336 (Communications and Information Technology Commission, 2018). The KSA shares its borders with Iraq and Jordan to the north, Kuwait to the north-east, Yemen to the south, and the Arabian Gulf, Qatar, the United Arab Emirates, and Bahrain to the east.

The KSA maintains a generally stable political and economic position, ranking 19th amongst the world's largest economies. It is also one of the world's most influential political and economic powers due to its role in Islam, economic wealth, control of oil prices, global supply, large media presence, satellite channels, and printed newspapers. The capital of the KSA is Riyadh; however, the country is divided into 13 administrative regions, each of which is further divided into governorates. These governorates vary in number from region to region. Furthermore, the KSA hosts the cities of Makkah and Medina, which are the most important holy sites for Muslims.

The official language of the KSA is Arabic, although a proportion of its population can speak and understand English. Saudi culture is strongly influenced by its history as the cradle of Islam (Alrashidi & Phan, 2015). Furthermore, the gender segregation imposed by Saudi cultural and societal norms affects all aspects of life, including education, because even the educational environment is divided according to the gender rules dictated by local Islamic law. This suggests that male and female students are segregated into separate buildings for their classes (Al Lily, 2011). Moreover, direct interaction between the two genders is rarely allowed in education, except in a few special cases (Al Lily, 2011). Instead, the female sections of learning institutions are run exclusively by female staff, and male lecturers instruct female students solely via closed-circuit television, in respect of the KSA's cultural and social rules.

Demographics of Saudi Arabia

As previously mentioned, the population of the KSA in 2017 was estimated at 32,552,336, with an average annual growth rate of 2.52%. The vast majority of this population (90%) is made up of Arabs, as expected, since the Arabian Peninsula is the original home of the Arabs (Communications and Information Technology Commission, 2018).

The KSA's current demographics indicate that between the medium to long term, the country may face serious job creation issues, necessitating priority development in the current education and training system, so that the requisite skills for the labour market are met. Thus, in 2018, Saudi Arabia began implementing its National Development Plan in the form of Vision 2030.

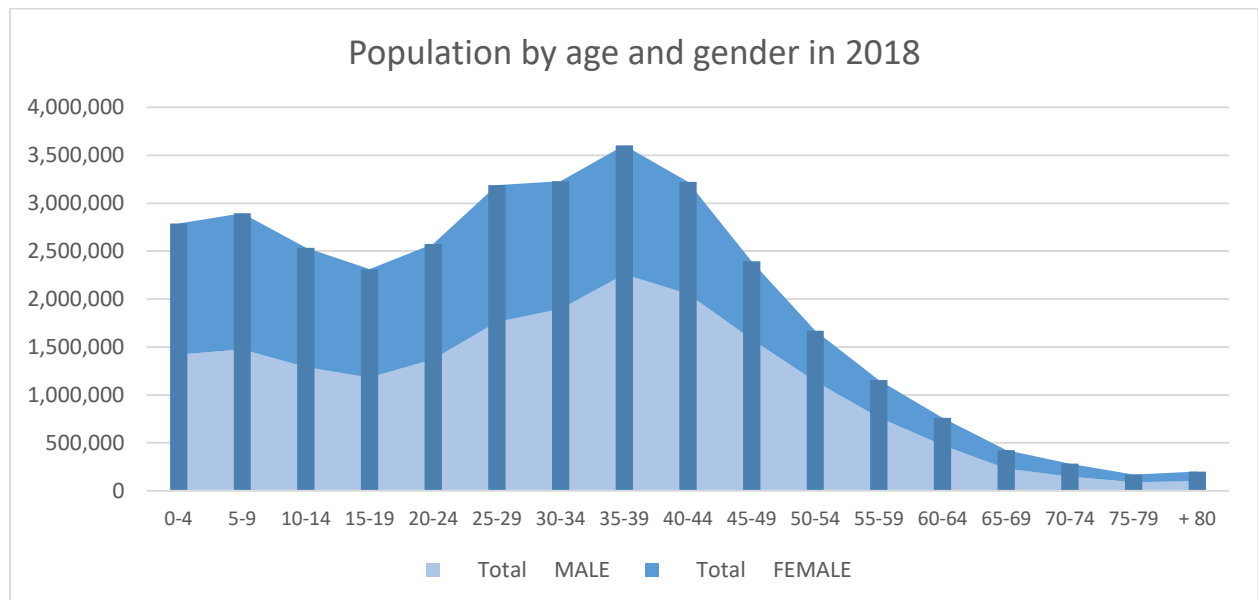


Figure 6 Population of Saudi Arabia concerning age distribution and gender.

Saudi Economy

Alrashidi et al. (2015) explain that Saudi Arabia has witnessed rapid development due to its vast revenue from oil exports. The authors further add that 80% of Saudi Arabia's income is generated from oil, thus making it one of the leading political and economic powers in the region (Alrashidi et al., 2015). However, Saudi government's new Vision 2030 is dedicated to diversifying the economy (Saudi Vision, 2018). It should also be noted that the KSA is one of the fastest growing economies in the Middle East (Alrashidi et al., 2015).

Cultural Norms and Religious Influences

In addition to the above, religious and cultural norms are significantly interrelated characteristics of the KSA. Saudi culture is a combination of traditional norms and Islamic values, whereby it is often difficult to distinguish between laws determined socially and those determined by religion (Al Lily, 2011). The KSA describes itself as an Islamic country, with the Holy Qur'an forming the basis of its constitution, and religion plays an important role in the daily lives, politics, and national education of the citizens. In fact, like the Arabic language, Islam defines the Saudi identity (Moaddel, 2006). In addition, it is known as the home of two holy mosques, the Great Mosque in Makkah and the Prophet's Mosque in Medina (Alrashidi et al., 2015).

At a social level, the distinctive feature of the KSA is its separation of the sexes, whereby men and women do not usually communicate with each other unless they are closely related or there is a pragmatic reason to do so, such as in the case of a seller and a buyer or a taxi driver and a passenger. Similarly, in Saudi educational institutions, male and female students are segregated into separate buildings, with a high degree of privacy assured for female students and very limited communication permitted between the divisions, if at all (Al Lily, 2011).

Nevertheless, the recent demographic transformation in the Arab world due to globalisation, the internet, social media, electronic learning (e-learning), students studying abroad, and women's rights movement have contributed to challenging traditional Saudi culture. For the past few decades, this has increasingly become evident and may likely continue in the future (Al-Bakr, Bruce, Davidson, Schlaffer & Kropiunigg, 2017). The internet and new technology have played a critical role in changing many cultural rules, especially the lifestyles and socio-cultural associations of women. One area of impact has been education, with the emergence of distance learning and e-learning (Al Lily, 2011).

Education in Saudi Arabia

Alrashidi et al. (2015) report that the Saudi government is aware of the importance of education when it comes to national development and has, therefore, encouraged student enrolment. Furthermore, public sector education is provided free of charge from primary to high school (Alrashidi et al., 2015). The authors further add that

although the education of girls has met with some resistance from certain segments of Saudi society in the past, based on the belief that non-religious education of girls is worthless, these factions within the Saudi society have gradually come to terms with the concept of education for women and now even support it.

Higher Education in Saudi Arabia

Overall, it can be seen that education in Saudi Arabia is constantly evolving. Higher education was first established in the KSA in 1949 by King Abdulaziz, beginning with the College of Sharia in Makkah. The college was eventually associated with King Abdulaziz University, the oldest college in the KSA established in Jeddah in 1967. King Abdulaziz University was later affiliated to the University of Umm Al-Qura in 1981. Meanwhile, King Saud University, one of the largest and oldest universities in the KSA, was established in 1959, opening its doors to female students in 1962. All schools and colleges in the KSA, ranging from primary schools to institutes of higher education, impose strict gender segregation, granting female students the privacy to take off the hijab that they would normally wear in the presence of men who are not close relatives.

At present, according to the General Authority for Statistics, there are 38 universities in the KSA, of which 29 are funded by the government. In 2017, the authority reported a total of 1,622,416 students enrolled at these institutions, with 203,704 students who graduated in 2016. Meanwhile, all universities in the KSA seek to improve the quality of education that they offer to provide a better learning experience and good outcomes.

Furthermore, Alebaikan et al. (2010) report that Saudi universities usually provide a traditional style of education based on face-to-face (F2F) lectures. In 2006, the authors further add that the National Plan for Information Technology was set out by the Saudi Ministry of Education to encourage e-learning and distance learning in Saudi universities. The plan was designed to enhance the quality of higher education and learning outcomes in the kingdom (Alebaikan et al., 2010).

Qassim University

In this current study, data was collected from students and lecturers at Qassim University, a state-funded university located in central Al-Qassim Province, Buraydah,

KSA, and founded in 2004. The university currently has 35 colleges distributed across 12 cities in Qassim. Students at the university study free of charge, because it is a public sector university.

The total number of students enrolled at the university in 2017 amounted to 68,738, with a female majority. Moreover, a total of over 7000 staff were employed by the university at the time, including academic and ancillary employees. Consistent with all education institutes in the KSA, the classrooms and other facilities are separated into male and female divisions (sections), although these divisions have more or less the same academic departments, such as Colleges of Health, Medicine, Computer Science, Natural Sciences, Education, Administration, Law, Religion, Languages, and Design. However, some departments are exclusive to the female section (such as sewing and nutrition) and others to the male section (such as military studies, engineering, architecture, and agriculture).

The teaching methods implemented at Qassim University remains traditional; therefore, the use of modern technology and contemporary teaching approaches is highly encouraged and still remains a desire for the future, although some obstacles, such as the shortage of computers and prohibition of personal devices in the classroom, may be encountered. The latter could be attributed to the prevailing notion amongst educators that using personal devices in the classroom will merely lead to students playing with them and being distracted from the lesson. Therefore, the use of mobile devices is generally forbidden at Qassim University. In fact, up until October 2017, no device equipped with a camera was permitted in all-female buildings. This policy was overturned nationwide, with public announcements on Saudi TV channels, aimed at preventing university officials and decision-makers from issuing bans on all mobile phones. This was the direct result of female students' demands for change, expressed via Twitter with a hashtag that became the top trend worldwide at the time.

Internet Usage in Saudi Arabia

The internet was introduced in the KSA in the late 1990s (Sait & Al-Tawil, 2007), and it was made formally available to the Saudi population in 1999 (Alebaikan et al., 2010). According to the Saudi Communications and Information Technology Commission (2018), over 90% of the nation's inhabitants subscribe to mobile broadband (Figure

7). Over the past few years, Saudi Arabia has seen significant growth in the rate of internet usage (Alzahrani, 2017).

Alzahrani (2017) shows that increased internet usage in the KSA is evident in its institutes of higher education and universities, although it has challenged certain cultural barriers concerning female students. Nevertheless, this growth in internet uptake was sufficient in influencing the Ministry of Education’s move to embrace new technology-based learning strategies (Alzahrani, 2017).

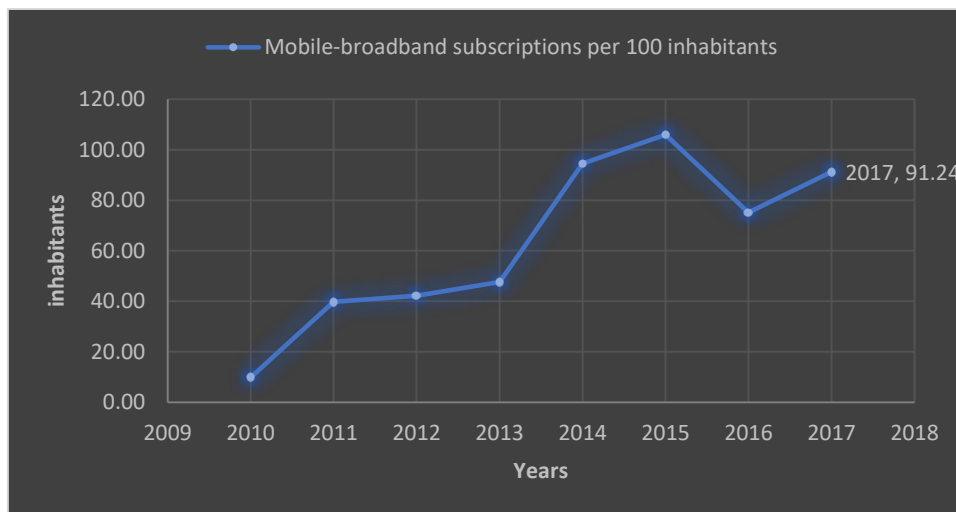


Figure 7 Mobile broadband subscriptions per 100 inhabitants in Saudi Arabia (Communications & Information Technology Commission, 2018)

Use of Mobile Devices in Saudi Arabia

The Ministry of Education of Saudi Arabia confirmed the launch of the Future Gate Project in state schools, which endeavours to introduce the use of mobile tablet devices in education. The first phase started in 2018, with 150 schools implementing mobile devices on their courses. The second phase started in 2019, with 1500 schools participating in the project. By 2020, all schools were expected to formally adopt mobile learning in Saudi education. The aim of the project is to eliminate the need for paper-based textbooks and replacing them with small mobile devices that contain interactive and engaging electronic educational materials (Ministry of Education, 2017).

Since the appearance of mobile devices in the global scene, the number of users has constantly increased. This has prompted manufacturers to develop their products to suit users’ needs. The General Authority for Statistics (2019) report that of the total

population of 34,218,169 in the KSA, 99.27% comprising people who are 15 years or above have a mobile smartphone, which will likely increase. The KSA is, therefore, ranked third in the world for per capita mobile phone usage (Badwelan et al., 2016). Badwelan et al. (2016) state that in 2017, the KSA was listed as the second biggest consumer of mobile online shopping in the Middle East. In fact, nearly one in four people made an online purchase via their mobile phones in the KSA that year (Statista, 2017), with the rate of mobile commerce increasing by nearly 57% amongst the nation's population (We Are Social, 2017).

Prior to this, by the end of 2016, the total number of mobile broadband subscriptions reached approximately 23.9 million, which was 75.2% of the population of the KSA (Mcit.gov.sa, 2017). The *We Are Social* (2017) website states that the average daily number of hours spent browsing the internet with mobile devices is 3.51 per capita in the KSA, ranking the nation 12th in the world for this category. In contrast, the average person in Saudi Arabia spends approximately 3.25 hours per day browsing the internet on a laptop or desktop.

In addition, Badwelan et al. (2016) point out that the KSA ranks 14th worldwide on the active use of social media, with 59% of the population being a part of the biggest social media networks every month, compared to the global average of 37%. Moreover, 49% of the kingdom's population access social media on mobile devices (We Are Social, 2017), with the KSA ranking third in the world for mobile connectivity (We Are Social, 2017). In fact, the number of active mobile internet connections in Saudi Arabia has increased by 176% of its national population in recent years (Mcit.gov.sa, 2017). However, only 11.09% of the population use mobile devices and the internet for learning and education (Mcit.gov.sa, 2017), which is a small number compared to the number of users employing mobile devices for other internet activities (Figure 8).

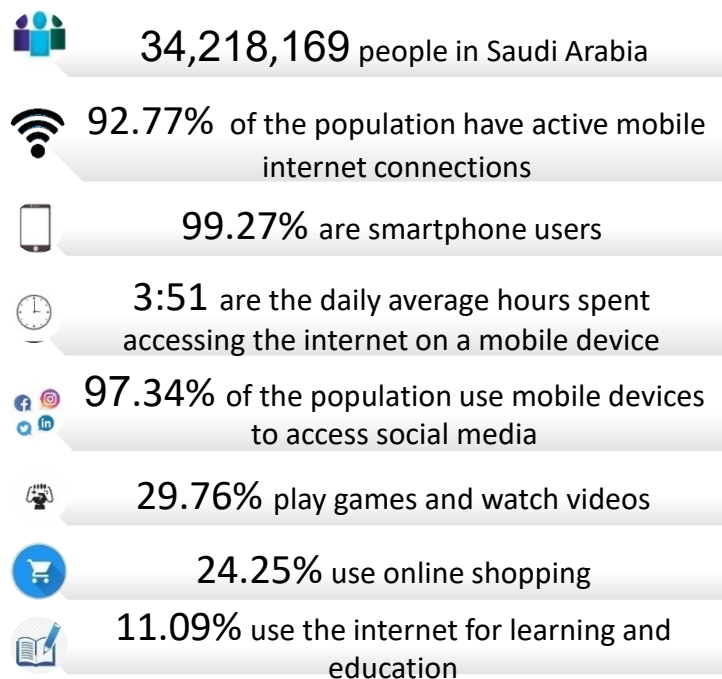


Figure 8 Use of internet and mobile devices in Saudi Arabia in 2019.

Use of Technologies in Saudi Higher Education

In line with Saudi Arabia's comprehensive development renaissance in various domains, the Ministry of Education established an infrastructure to guarantee the optimised use of information and communications technology (ICT) (Almutairy et al., 2015). To support mobile learning, many Saudi universities and institutions have started to provide appropriate facilities (Almutairy et al., 2015). However, some educators and lecturers remained unaccustomed to technology in traditional education. Moreover, the use of mobile devices with smart features or an integrated camera was banned for girls in most Saudi universities up until the end of 2017.

Saudi Vision 2030

According to the official Saudi Vision 2030 website, the KSA endeavours to digitise its education system by 2030. One of the main concerns of this vision is to support the country's economy by bridging the gap between education output and labour market requirements. In the vision, education should advance the economic development by making it the basis of development and the spirit of the progress, where ideas will be created and minds given room for positive growth (Alotaibia & Elnaimb, 2020). Its goal, therefore, includes developing the kingdom's universities to ensure that at least five of

them appear in the list of the top-200 universities in the world. To this end, modern technologies and effective instructional strategies are being integrated to bring about a renaissance in Saudi education.



Figure 9 Students' profile in Saudi Vision 2030

Chapter Three: Literature Review

Introduction

There is a global movement demanding all higher learning educational institutions to adhere to the needs of the 21st century. Higher education institutions (HEIs) have recognised the significance of blending learning, which refers to face-to-face (F2F) learning combined with online learning, in enhancing learning quality (Al Masarweh, 2019). This vast adjustment in Saudi Arabia's higher education system has made universities and other higher learning institutions change with this global trend. As a teacher in one of Saudi Arabia's HEIs, I sensed the increasing need to implement online learning in higher education in the country, specifically blended mobile learning. Moreover, my background in teaching education and computer science inspired me to conduct this study and analyse some of the effects of blended mobile learning on instruction and learning in the context of Saudi Arabia's higher education. I, therefore, conducted this study with the aim of focussing primarily on the perceptions of both students and lecturers towards blended mobile learning. The sections below review the relevant literature and research on blended learning, mobile learning, and the application of the latter in education. However, there are limited studies concerning using mobile learning in blended learning. Thus, I focussed on studies that investigated mobile learning in education and formal learning. In this chapter, a number of topics are clarified, such as the potential uses, advantages, and benefits of mobile learning; mobile learning in higher education in general; the adoption of blended mobile learning in education, together with its effects on teaching and learners; the use of mobile devices in Saudi Arabia, especially student acceptance and use; and the challenges and barriers of blended learning.

Understanding of Terms; Perceptions, Opinions, and Attitude

First of all, this study is concerned with the acceptance and perception of students and lecturers, so these terms as well as terms frequently used in this study, such as 'opinions' and 'attitudes', must be defined.

Basically, perceptions mean the extent to which individuals are familiar with, know, and understand mobile learning and blended learning; it also refers to their

understanding of using mobile learning formally in a blended learning environment. The word 'perception' originates from the Latin words 'percipere and *perceptio*, which mean collecting, receiving, and understanding with the mind or senses (Qiong, 2017). It is defined as a process of how each individual assesses an object (Yunita & Maisarah, 2020). Triyono and Febriani (2018) state perception has two definitions in a broad and narrow sense. They add that the word, in a narrow sense, refers to how each person sees an object. Moreover, in a broad sense, it is an understanding or view of how people see or interpret a specific object (Triyono et al., 2018, as cited in Yunita et al., 2020). In philosophy, cognitive science and psychology, perception is defined as the process of gaining an understanding or awareness of sensory information (Qiong, 2017).

On the other hand, acceptance is defined as the degree of each person manifesting their intention behaviourally, where they decide to use or not to use a system (Adell, 2008). In addition, it shows the individual's willingness to adopt technology for certain tasks that it was designed for (Teo, 2011). In fact, the unified theory of acceptance and use of technology (UTAUT) has given benefits in understanding what variables either enable or prevent the acceptance of the use of technology (Adell, 2008).

In the literature, the term 'opinion' may be replaced by words such as 'knowledge' or 'cognition' (Kepplinger, 2008). It refers to how an individual thinks about a particular thing. Opinions are important in this thesis to know the individual's views and thoughts. Furthermore, attitudes are mentioned in this thesis to know individuals' feelings towards the use of mobile learning in a blended learning environment. When the individual tends to express good or bad feelings after evaluating a behaviour or an object, it is called an attitude. Therefore, the individual's attitude refers to the positive or negative judgement of performing the behaviour (Kim, Chun & Song, 2009). The attitude in the affective aspect is defined as the degree an individual likes the object of thought, and cognitive aspect is defined as the individual's specific beliefs about the object (Yang & Yoo, 2004).

Part A: Blended Learning

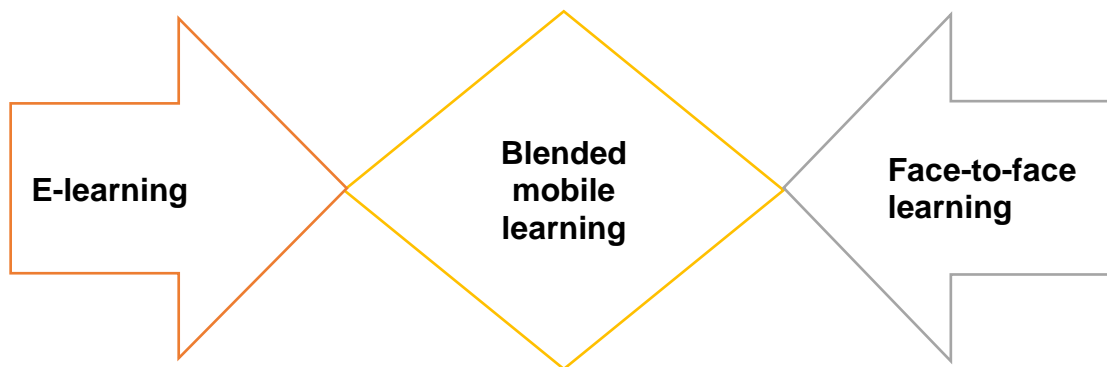


Figure 10 Main components of blended learning

Blended learning is increasingly popular and universal, crossing global boundaries and creating learners in different cultures, locations, and time zones, who can attend the same classes and learning environments without being physically present (Soya, 2018). Within just two decades, blended learning (also called hybrid learning) has become a widespread educational approach, because it integrates web-based teaching strategies with F2F instruction (Alshehri, 2017). Many researchers have focussed on investigating learning strategies that blend F2F with online instruction to deliver what is commonly referred to as 'blended learning' (Alebaikan et al., 2010). Blended learning is, therefore, a mid-point between exclusive F2F learning environments and pure electronic learning (e-learning) (O'Byrne et al., 2015). In modern education, blended learning is seen as a new paradigm that combines e-learning methods and the F2F learning approach (Chen et al., 2016). It resulted from the need to address the disadvantages of e-learning, such as the failure to offer sufficient options, social communication, participation, relevance, or context to facilitate successful learning performance (Singh, 2003). This form of learning is, therefore, aimed at retaining the advantages of both e-learning and direct contact between students and instructors (Alzahrani, 2017).

Because of its increasing popularity, availability, and widespread use of new digital technologies, computer-mediated learning tools have become increasingly common in traditional F2F learning environments (Graham, 2006). In fact, new technologies are rapidly transforming the world; therefore, educators should be ready to blend new technologies with traditional education for the benefit of students who have grown up reading digital books, using social media, watching YouTube videos,

and playing computer games (Buran & Evseeva, 2015). It is this inherent potential to manipulate or modify time, place, and space to enhance education that gives blended learning much of its power (O'Byrne et al., 2015). On the contrary, a study conducted in a developing country using an online survey of 196 male and female university students found that their academic performance was negatively impacted by web-based learning (Baragash et al., 2018).

Güzer and Caner (2014) reviewed the most popular articles and books on blended learning, sourced via Google Scholar, and classified them into four main periods: (1) articles published between 1999 and 2002, which attempt to position blended learning as a concept that can assist with online learning through traditional F2F learning, although no definition of blended learning was formulated during that period; (2) articles published between 2003 and 2006, when researchers were concerned with definitions of blended learning; (3) articles published between 2007 and 2009, when blended learning research was gaining popularity; and (4) articles published between 2010 and the present, where Güzer et al. (2014) limited their classification to 2012. Contemporary studies on this form of learning vary across different areas of education, but it receives a great deal of attention from researchers who agreed that it is often preferred by the populations studied. Moreover, the effectiveness of blended learning is measured according to a number of variables, such as learners' motivation, attitudes, and learning achievements. Finally, other scholars suggest that future research on blended learning is warranted, focussing on organised blended learning environments to support effective learning as well as concentrating on the use of new technologies, such as smartphones, tablets, and other small touchscreen devices, in blended learning environments (Güzer et al., 2014). In this study, blended learning is defined as the integration of F2F learning and e-learning in education. In F2F learning, students feel their social presence and can interact directly with their teacher and peers (Shand & Farrelly, 2018). According to Singh (2003), F2F learning is a physical, class-based learning that enables synchronous learning, such as instructor-led lectures, workshops, and field trips. In addition, e-learning or online learning could be asynchronous or synchronous learning. O'Byrne et al. (2015) argue that blended learning permits asynchronous learning. The authors further add that an educator can create metacognitive delay to enable the student to learn at their own pace, which may involve a delayed or immediate response.

Moreover, a learner can 'pause' their learning. Asynchronous learning can occur in online environments through reading, writing, video watching, and blogging activities (O'Byrne et al., 2015). Meanwhile, online tools include videos, tutorials, and games that can support learning in different ways. This can be useful for teaching students with specific needs (Shand et al., 2018). In other words, online learning can be synchronous live e-learning (for example, through online meetings, virtual classrooms, web seminars, and video conference calls) as well as asynchronous self-education, where the learner is able to control the pace (for example, through documents, blogs, web pages, communities, discussion forums, simulations, and distributed learning) (Singh, 2003).

Blended Learning Models

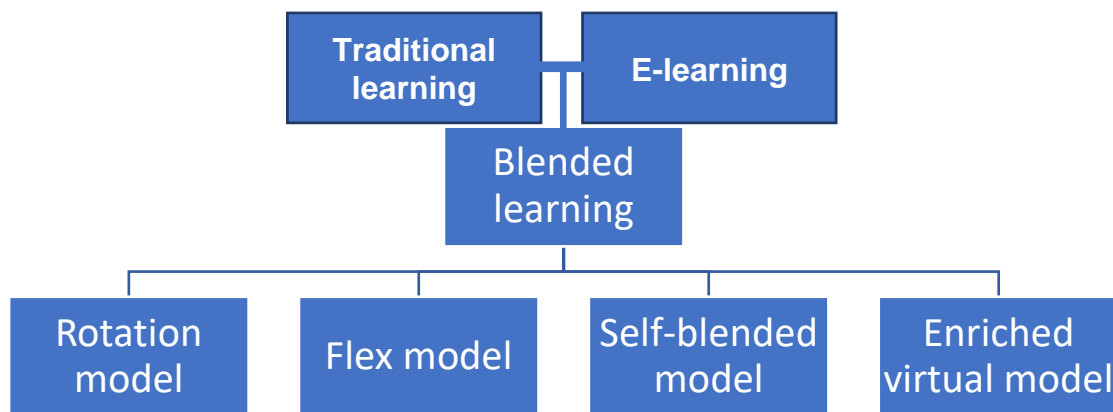


Figure 11 Models of blended learning

Barry and Alhazmi (2018) summarise the following as the four most commonly used models of blended learning:

1. Rotation model: Students rotate learning activities, completing them according to a fixed schedule under the supervision of a teacher. Students may rotate individually or in groups between learning stations, which can take the form of traditional education or e-learning. However, all these stations are linked and share the same educational aim but via different teaching methods. The teacher guiding the students throughout these stages is located in one of these stations and interacts F2F with the students (Barry et al., 2018).



Figure 12 Rotation Model

2. Flex model: In this model, instructions are mainly given on online platforms in a physical classroom, while the students learn at their own pace. The role of the teacher is to instruct the groups and offer individual assistance when needed (Barry et al., 2018).
3. Self-blended model: The learning can take place in an online environment, either at home or at school and as part of a traditional course. The teacher's role is to provide instructions using both online and F2F methods. Therefore, students can receive help with their online courses from a teacher at school (Barry et al., 2018).
4. Enriched virtual model: In this learning model, the learning usually begins with exclusive online learning via the internet, followed by traditional integrated classes developed to provide students with learning experiences in school via F2F supplementation. Therefore, students divide their time between attending school and e-learning, which is where they find the educational content (Barry et al., 2018).

All these models are capable of using mobile devices and become blended mobile learning models. The educators could choose the best model that suits their courses and students' skills and use it with mobile devices. The ubiquity of mobile devices amongst students can help them access the learning materials anywhere and anytime, leading to increased interaction in both formal and informal learning (Eppard, Hojeij, Ozdemir-Ayber, Rodjan-Helder & Baroudi, 2019). The point of using mobile devices and its technologies is that it is moveable and has a lot of features, thus making it a great learning tool. In fact, this study focusses on blended mobile learning in the educational environment where the teacher role becomes a guide, coach,

mentor and support. The implementation of these models with the use of mobile technologies could solve some educational issues—for instance, the lack of computers in schools and their high cost; the spatial and temporal barrier of the learning process; students' individual differences; and other educational issues.

Approaches to Designing Blended Learning

Alammary et al. (2014) identifies three distinct design approaches for developing blended learning courses:

1. **Low-impact blend:** In this approach, additional online activities are integrated into traditional F2F courses. This approach is easy to design and saves time and effort in developing a new design, presents low-risk failure, and requires minimal teaching experience to design one. However, it has some limitations, such as teachers requiring a certain amount of technological knowledge, high risks associated with developing two separate courses, and the addition of new activities without deleting any pre-designed activities, which may lead to increased burden on teachers and students.
2. **Medium-impact blend:** Here, some of the activities in an existing course are replaced. One of the benefits of this approach is the replacement of course ingredients through incremental implementation. These experiences enhance the teachers' confidence in managing a blended learning course. Moreover, this approach suits teachers who do not want to make significant changes to their existing courses, allowing them to experiment with new learning approaches without losing the benefits of a traditional course. Similar to the previous approach, this blend has some limitations too, such as teachers requiring good technological knowledge and a certain amount of time and effort to replace activities in designing a blended course. In addition, there are no defined standards to guide this replacement, and it requires prior traditional teaching experience, with a need for long-term processes of design, observation, and assessment.
3. **High-impact blend:** Here, the design of the blended course is built from scratch. The benefits of this approach include improvements that can be made to eliminate problems in existing courses and an effective blend of F2F with online components, maximising the benefit of blended learning courses. Conversely, the limitations of this approach include teachers requiring a high level of technological knowledge;

there is a greater risk of failure associated with this approach than with the other two approaches. It demands a great deal of effort, experience of blended learning, and significant time for implementation from teachers.

Alammary et al. (2014) recommend teachers to choose one of these approaches according to their experience in designing blended learning courses. Furthermore, these approaches may be applicable to blended mobile learning strategy as well. The difference is the substitution of online learning activities with mobile learning activities in a blended learning environment. In reality, blended mobile learning in the Kingdom of Saudi Arabia (KSA) is in its early stages; consequently, the study focusses on using this strategy via a low-impact blend approach. However, on account of the coronavirus disease 2019 (COVID-19) pandemic, social distancing and consequently online learning in mobile blended learning strategy are much necessitated. Therefore, an approach of high-impact blend may be more appropriate in this age.

Advantages and Benefits of Blended Learning

Güzer et al. (2014) state that since the emergence of the internet and its increasing popularity amongst students, distance learning has become an increasingly common alternative to traditional F2F learning, leading researchers to focus on the comparison between these two instructional approaches. Furthermore, blended learning came to the fore in the early 2000s, capturing the interest of scholars and claiming all the benefits of distance and traditional learning combined (Güzer et al., 2014). In response to containing the spread of COVID-19, lockdowns and social distancing have been imposed worldwide, including school closures, and blended learning has gained more importance. This form of learning certainly has many positive effects on the learning process, such as improved learning outcomes, increased access to learning content, cost effectiveness, flexible learning, and ensuring that institutions stay up to date (Barry et al., 2018). Güzer et al. (2014) reviewed the top-28 most cited articles and books on Google Scholar and concluded that all researchers studying blended learning agree on its positive effects with regard to supporting and enhancing learning, with greater motivation for learners and more learning enjoyment and flexibility. To ensure that the right content is provided at the right time and in the right format for the right people, educational institutes need to adopt blended learning approaches that meet every learner's needs and preferences (Singh, 2003).

Many benefits of blended learning have been reported in the literature, such as flexibility, where students can work at their own pace. Their learning is reinforced, and their engagement with their peers is also increased (Shand et al., 2018). In addition, this form of learning offers dynamic and accelerated learning with minimal time lost, compared to F2F modes. This is necessary in a fast-paced lifestyle and is, therefore, preferred by students seeking to accelerate their education (Matukhin et al., 2015). Soya (2018) lists many other noticeable benefits of using blended learning in education, including its positive effects on classroom utilisation, the development of independent learning skills, the global boundaries being transcended, the assistance it offers students to overcome distance barriers, the increased learning flexibility, the access to a modern learning approach that meets students' expectations, the student-centred pedagogy, and the possibility of students joining a physical community. Furthermore, researchers also observe that blended learning can be a transformative learning experience, as new teaching modes potentially challenge teachers to think about the best ways of instructing their students (O'Byrne et al., 2015).

Matukhin et al. (2015) found that the implementation of blended learning in higher education supports learners' individuality and facilitates differentiation. It also supports usability, adaptability, and clarity of principles in learning (Matukhin et al., 2015). The authors investigated students' attitudes towards the use of new technological tools in education, before and after applying a blended learning course to teach English. Two questionnaires were administered to a sample of 128 first-year engineering students and found that the students' readiness and interest in adopting new technological tools in their education radically increased (Matukhin et al., 2015).

A study conducted by Buran et al. (2015) sampled over 550 students aiming to better understand the effect of blended learning on teaching English as a foreign language (EFL). The study found six advantages of implementing blended learning as an alternative to traditional methods. First, blended learning developed the students' critical thinking and online research skills. Second, the students experienced independent learning and had more flexibility to choose an appropriate time and place for studying. Third, the students' reading skills improved, due to a high volume of online information. Fourth, the students' writing skills were enhanced by completing writing tasks, posting comments, and completing tests. Fifth, because blended learning is

designed to meet students' needs, their motivation to learn the English language increased. Finally, the students' listening skills developed by watching videos (Buran et al., 2015).

Meanwhile, Singh (2003) highlight three main benefits of blended learning. First, it extends the reach of the learning by going beyond physical places and pre-determined times, which would otherwise limit learners' access to a learning programme. In view of the physical inadequacy of current educational facilities in the KSA, blended learning can serve the students' needs (Aldosemani, Shepherd & Bolliger, 2019). Second, it saves cost and time. For example, the use of online learning on its own is expensive, but a blend of F2F and online learning reduces costs and development time (Singh, 2003; Aldosemani et al., 2019). Third, Singh (2003) and Alrouji (2020) suggest that blended learning delivers learning more efficiently and effectively. In brief, blended learning is considered a solution for managing flexibility, growth, and cost in learning (Graham et al., 2013).

Al-Qahtani and Higgins (2013) conducted a study at Umm Al-Qura University, KSA, investigating the effects of traditional learning, e-learning, and blended learning on students. Overall, 148 students were randomly selected and divided into three learning groups. The first group received the university's traditional teaching method in an F2F strategy; the second group used an e-learning strategy; finally, the third group used a blended learning teaching strategy. In addition, pre- and post-achievement tests were administered to distinguish the effect of each teaching strategy. The study found that students in the blended learning strategy group demonstrated higher achievement than those taught using the traditional method and pure e-learning strategy. The study emphasises that a blended learning approach has a positive effect on learning outcomes and can effectively support students' learning to a greater extent than an exclusively traditional F2F or e-learning approach. Blended learning combines the advantages of direct interaction with an instructor in F2F learning and the flexibility of e-learning (Al-Qahtani & Higgins, 2013).

Deschacht and Goeman (2015) conducted a study to investigate the effect of blended learning on adult students to promote their success in an academic business education programme. The researchers identify adult learning as students returning to university to continue formal education programmes after being out of education for

a certain period. Unlike younger students, they often have family or work responsibilities, which affected their educational engagement. The authors indicate that blended learning had a positive effect on learners' performance but not on course retention, as course dropout rates increased irrespective of that. However, the total number of students who successfully completed their blended learning courses was higher than those on the old traditional learning courses (Deschacht et al., 2015).

Similarly, in 2016, a survey was conducted at the end of a blended learning course that was teaching foreign languages, with a sample of 98 students. The study's results showed high acceptance and greater preference than any other learning modes amongst the students. Hubackova and Semradova (2016) interpreted this as an indication that current students accept new technology rapidly and learn how to handle it with ease. In addition, the students found it convenient for communicating with their lecturers and enjoyed using the online communication tools. Hubackova et al. (2016) mention certain advantages of blended learning, such as the possibility for individual space, allowing students to elect a suitable place, time, and pace for learning and the provision of immediate feedback. In addition, the students appreciated how easy it was to keep track of their work and achievements, which also enabled anonymous comparisons to be made between students. Furthermore, the authors concluded that the integration of close-contact teaching, built on constructivist principles and an e-learning teaching format, was an appropriate and necessary education strategy, especially when teaching foreign languages (Hubackova et al., 2016).

Alzahrani (2017) cites three main reasons that make blended learning necessary in Saudi higher education. First, it is the massive increase in the number of students enrolled every year in Saudi Arabia, who are likely to favour a blended learning style. The author also mentions that many previous studies have been conducted in a Saudi education context, which concluded that traditional learning that is blended with e-learning is the preferred learning style amongst students. The second reason is the predominance of traditional learning in Saudi universities, where the teaching mainly takes place in the classroom in F2F narrative lectures (Alzahrani, 2017). The third reason is Ministry of Education's effort to improve the quality of teaching and education, whereby studies have revealed the positive effects of blended learning on

student satisfaction, achievement, and learning outcomes. This compares favourably with full e-learning or purely traditional learning, although, like blended learning, e-learning has been found to make students more active (Alzahrani, 2017).

A recent trend in Saudi Arabia is the integration of blended learning in higher education (Anas, 2020). It has become increasingly important in light of students' dissatisfaction with fully online courses due to the lack of personal interaction between themselves and with their teachers (Alshehri, 2017). Blended learning attracts teachers and educators in higher education due to the fewer resources and lower level of expertise required in it when compared to learning that takes place exclusively online (Alshehri, 2017). It can improve the learning experience through the use of computer-mediated learning as well as help reduce costs associated with F2F learning. As a result, there is increasing flexibility and support for universities to offer a modern approach to teaching and learning (Binyamin, Rutter & Smith, 2017). Students are also attracted to this mode of learning due to the increasing flexibility of study schedules (Alshehri, 2017). Constraints, such as class location, time, size, and availability of technology, in higher education environments may potentially represent essential barriers to transformative change (Graham, 2006).

Blended Learning in Saudi Arabia

Blended learning is relatively new in Saudi Arabia, and therefore, it is imperative for scholars to explore how education stakeholders perceive it. Blended learning is a growing trend in Saudi universities for delivering educational programmes (Alzahrani, 2017). Despite concerns over attaining the desired educational goals and the high cost of web-based learning, there is an incentive in Saudi higher education to shift learning away from traditional approaches and towards new forms of e-learning and blended learning (Alshehri, 2017). The Saudi Ministry of Education encourages universities to improve learning and education, aligning itself with international trends in the adoption of technologies and new learning methods to suit the contemporary student (Alzahrani, 2017; Al Harthi, 2018).

The study conducted by Gulnaz, Althomali, and Alzeer (2020) aims to establish how English learning using blended approaches is perceived by the students. The findings of the study revealed that the learners were happy when images, audios,

videos, and chats were used in enhancing the acquisition of EFL. Similarly, Anas (2020) examined how students at the University of Bisha viewed blended learning and found that, contrary to expectations, using technology in higher education is highly embraced. Nonetheless, unlike Gulnaz et al. (2020), Anas (2020) notes that physically illustrated teaching content was preferred by the learners as compared to videos or audios. Therefore, educators are encouraged to apply blended learning in the creation of more efficient learning environments (Alzahrani, 2017).

Despite the advantages, only few institutions have formally adopted the blended learning approach. Many courses, however, comprise some level of blended learning due to the combined efforts of the faculty as a whole or the individual lecturer to enhance student learning outcomes (Graham et al., 2013). A study conducted by Alnahdi (2019) indicates the Saudi government's high interest in integrating blended learning in higher education, although there is a need for training both lecturers and students to use information and communications technology (ICT). However, the students did not show enough readiness to study independent in blended learning (Alnahdi, 2019). Khalil et al. (2020) points out that e-learning and blended learning played a vital role in supplementing conventional learning during the COVID-19 pandemic when most schools were closed. Alharbi et al. (2017) recognise inadequate time and lacking ICT skills as the main inhibitors of blended learning in the KSA.

Challenges and Barriers of Blended Learning

1. Self-discipline: One of the barriers to successful blended learning is the lack of discipline amongst students (Buran et al., 2015). Self-discipline is highlighted as an issue of time management, where students are expected to complete tasks within a specific timeframe and in a specific manner (Shand et al., 2018).
2. Teachers' lack of online teaching skills: In a study conducted at King Saud University in Saudi Arabia, focus groups and in-depth interviews were rolled out with female instructors. It was found that the faculty from Saudi universities tends to have limited technical and pedagogical experience of teaching and managing web-based learning strategies in blended learning environments (Alebaikan et al., 2010). There is a need of additional training for some lecturers to use ICT more effectively in courses that implement blended learning (Alzahrani, 2017).

Aldosemani et al. (2019) conducted another study in a Saudi university and concluded that the lecturers needed training and time for learning and experimenting with new online technologies for teaching. In response to this barrier, the authors suggested providing e-learning workshops to educate lecturers.

3. Budget for infrastructure: Before implementing blended learning, universities need to install computer laboratories on campus, with each computer connected to the internet (Alebaikan et al., 2010). To effectively adopt blended learning in the KSA, infrastructures such as internet and data hosting models in HEIs are needed (Aldosemani et al. 2019).
4. Students' avoidance of the online aspect of a blended learning environment: A study conducted by Ellis et al. (2018) using a questionnaire to investigate 201 undergraduate engineering students found that there were a number of reasons that caused students to avoid the online learning aspect of a blended learning environment. The researchers further clarify that students tend to prefer working F2F, adding that students perceive the online component as unrelated to their course and merely an additional workload. Furthermore, students can fail to perceive the value of reviewing other students' contributions in an online environment (Ellis et al., 2018).

Previous research has found that the barriers listed above inhibited the successful implementation of blended learning. This study, however, focussed on the 'bring your own device' (BYOD) strategy to avoid high costs. Moreover, working with mobile devices is familiar to students, unlike using unfamiliar computers or programmes that prompt students to avoid learning. Furthermore, this study conducted an in-depth investigation of the viewpoints of students and lecturers. Besides, it also explored the student and lecturer's acceptance and confidence in using blended mobile learning, as this was one of this study's aims.

Part B: Mobile Learning

Traxler and Kukulska-Hulme (2015) clarify that mobile learning researchers confirm the capacity of mobile devices to spread, enrich, enhance, and defy current ideas about learning. Moreover, they challenged some of the theories and conceptions of

learning based on their research on mobile technologies and devices in the field of education. Therefore, a substantial body of literature illustrates that mobile learning has a positive effect on increasing learners' motivation, particularly in the case of disengaged and disenfranchised learners (Traxler et al., 2015).

Mobile devices include the following:

1. Smartphones
2. Tablets
3. Personal digital assistants
4. Wearable smart devices

Uses of Mobile Devices

At present, mobile devices have many uses, one of which is for entertainment, such as listening to music, playing games, and browsing web pages (Kim, Lee & Rha, 2017). Apart from entertainment, mobile devices are used for banking, shopping, security systems, navigation, the 'internet of things', personal health, among numerous other uses. Furthermore, mobile devices and their technologies have also brought about an evolution in human interaction and communication (Briz-Ponce, Pereira, Carvalho, Juanes-Méndez & García-Peñalvo, 2017). They may now be described as one of the most common tools of communication worldwide, used for socialisation, interpersonal communication, professional tasks, and much more (Lin & Chiang, 2017). After radio, mobile phones are the most widely diffused communication devices (Brand & Kinash, 2010). Through the use of small, portable, wireless, handheld mobile devices, mobile learning, therefore, enables learners to communicate and access knowledge (Alshehri & Cumming, 2020).

In addition, portable, handheld mobile devices may be connected to the network at any time and from any location through public networks (Al-Fahad, 2009). Quinn (2011) elaborates on this, describing a mobile device as an instrument with a processor, memory, operating system, camera, microphone, and geographical positioning system (GPS). He adds that it supports different types of uploaded apps that are selected according to the user's wishes and lifestyle habits. These devices can also communicate with their users via videos, text, symbols, images, vibration, or audio functions, while the user controls the device using a touch screen, small

keyboard, audio features, and positioning of the device. In addition, the device can access phone networks, wireless internet, and sometimes cable or Bluetooth to interact with the digital world (Quinn, 2011). Mobile devices facilitate users' access to information, knowledge, and communication, which has brought about a number of cultural and social changes: for example, in managing everyday life, individuals will almost always use a mobile phone or access the internet (Dirin & Nieminen, 2017). Recently, the mobile phone has become the main preferred medium whereby users conduct their banking, shopping, flight booking, amongst other tasks. It is a single unique tool that can mediate between individuals, individuals and institutions, and individuals and the world of inanimate objects (Alotaibia et al., 2020). Previous studies show that the use of mobile phones has replaced the use of other technologies, such as television and video games. Further, it is related to recreational activities and communication (Martínez-Sánchez, Goig-Martínez, Álvarez-Rodríguez & Fernández-Cruz, 2020). In recent times, mobile devices have extremely compute-intensive mobile applications (apps) that use built-in sensors for functions, such as road traffic measurement, healthcare and diagnosis, reality augmentation, monitoring of air pollution, pattern or gesture recognition, smart education, and many others that are suitable to build smart cities (Enayet, Razzaque, Hassan, Alamri & Fortino, 2018; Roy, Sarker, Razzaque, Mamun-or-Rashid, Hassan & Fortino, 2020). Previous research shows how mobile devices are the most popular learning tool in higher education (Biswas, Roy & Roy, 2020). In particular, in a blended learning environment, mobile devices are being considered as a solution to the potential shortage of computers in institutions, which can lead to an inability to access online learning content (Mayisela, 2013).

Potential Uses, Advantages, and Benefits of Mobile Learning

Mobile devices and their technologies are considered significant tools that can enhance learning and communication (Al-Fahad, 2009). They have consequently changed society, the shape of learning, and the provision of education (Alharbi et al., 2014). By using small-scale technological devices, students and educators can manage their daily tasks quickly and easily anywhere and at any time (Al-Emran et al., 2016). Overall, the most unique and remarkable feature of mobile devices is their actual mobility (Martiniello & Paparella, 2016), which permits mobile learning in any

location or situation, such as within traditional educational institutes, where a student can even implement it in classrooms and lecture halls (Hashemi et al., 2011).

Because of the technological revolution in the modern world, mobile learning is identified as the latest means of facilitating learning (Hosseini et al., 2015). Education has changed, with traditional ways of teaching becoming less appealing to students, who tend to prefer new technologies and teaching methods, such as mobile learning (Almutairy et al., 2015). The main advantages of mobile learning are its mobility and flexibility as well as various other features offered by mobile devices, such as the option to use handwriting, extended collaboration, and portability (Abu-Al-Aish & Love, 2013). In fact, it is becoming widely known that mobile learning enhances learning outcomes, impacts students' attitudes and engagement, and supports their performance (Martin & Ertzberger, 2016).

In fact, most studies on mobile learning declare the positive effects of using mobile devices and their technologies in learning and education (Pimmer et al., 2016), pointing to a positive correlation between adopting mobile learning in education and enhanced academic achievement amongst students (Alfarani, 2014; Alkhalaf, Amasha & Al-Jarallah, 2017). This is because mobile devices facilitate students' retrieval of or search for information, organisation of references, documentation of experiences, communication, dialogue with teachers and peers, and integration of formal education into students' daily lives (Koole, McQuilkin & Ally, 2010; Crompton & Traxler 2019). In short, mobile learning has the power to change and develop learning and teaching methods, as numerous instructional opportunities become possible through the use of mobile technologies and their positive impact on education can be benefitted from (Soya, 2018).

Mobile learning has, therefore, become a significant agent that is capable of broadening the frontiers of learning instruction and education, beyond the walls of the school, because of the advantages of mobile devices, such as portability, availability, connection to the internet, and massive interest and acceptance amongst people of all ages (Borba, Askar, Engelbrecht, Gadanidis, Llinares & Aguilar, 2016). Hence, mobile learning is reported as an engaging and effective way of improving teaching and learning EFL (Albedah et al., 2017).

Apart from the above, mobile technologies increase collaboration amongst students, facilitate their acquisition of knowledge and information searches, improve interaction between teachers and students, and ease access to learning resources at any time and from anywhere (Chee, Yahaya, Ibrahim & Hasan, 2017). Thus, mobile learning is a very attractive educational solution, due to the availability of mobile devices and their potential to facilitate access to resources and information, whenever and wherever they are needed, thereby simplifying contextual learning (Molnar, 2016). The outcome of this is that instead of learners sitting hidden behind large PC monitors, they can interact with each other and with their teachers in educational environments, using mobile devices (Hashemi et al., 2011).

Pimmer (2016) emphasises that social media accessed via mobile devices serves to transcend boundaries. He adds that they represent tools for encouraging students to create multimodal expressions of their experiences, opinions, and identities. Recent developments in mobile devices, with new apps and features, have been released sequentially in a brand-new technological era, which offers novel and unique forms of interaction (Kuppuswamy & Al-Turki, 2014). Mobile devices are valuable in education, because they can be used to organise, administer, and support teaching and learning (Hashmi et al., 2011; Biswas et al., 2020). According to Schuck et al. (2016), mobile learning provides the structure for a new understanding of 'third space' learning, which is the space between formal and informal learning. They add that mobile learning enables learning to take place across contexts and boundaries. Similarly, according to Lai et al. (2013), mobile learning can bridge the gap between formal and informal learning, meeting the need to create methods and strategies that will generate links between learning in formal and informal contexts. Moreover, they cite mobile learning as the first step towards resolving the lack of connection between formal and informal learning, identifying the barriers and challenges that prevent these two spheres of learning from being bridged (Lai et al., 2013).

Mobile devices and their associated technologies suit college students' needs; for example, they can help answer their questions, encourage collaboration, improve communication, facilitate conversation, enable access to social media and knowledge-sharing, enhance learning outcomes, and assist students with special needs (Al-Emran et al., 2016). Hashmi and others explain that some learning activities can be

effectively performed using mobile devices, such as accessing and sharing documents, attempting tests, carrying out self-assessment, playing educational games, participating in tutorials, retrieving archived lectures, accessing live broadcasts or audio–visual material, displaying students’ work, and engaging with virtual learning communities (Hashmi et al., 2011). Although some researchers claim that multitasking on mobile devices can distract students, others point out that mobile learning improves perceptions of collaborative learning amongst students, supports student independence, increases their engagement, and enhances communication (Heflin, Shewmaker & Nguyen, 2017). In fact, educators think students can become involved in activities using their mobile devices both within and outside the classroom (Moreira et al., 2018).

The perception of mobile learning’s usability and usefulness affects students’ behavioural intention to use mobile devices in education (Alharbi et al., 2014). The affordability and ease of use of mobile devices are attractive factors, leading to their adoption for learning (Alshammari, Parkes & Adlington, 2018). In a study conducted at the University of Coimbra in Portugal, 94% of a sample consisting of 160 medical students reported that they thought mobile technologies were easy to use for learning (Briz-Ponce et al., 2017). Furthermore, mobile learning enables online learning through wireless networks accessed by mobile devices, downloading or uploading learning materials, and links formed with educational institutions (Hashemi et al., 2011). It is considered the most innovative, exciting, and advanced learning system in HEIs, which is very useful in facing education challenges during this COVID-19 pandemic (Biswas et al., 2020).

Use of Mobile Apps

Mobile device apps are especially popular amongst users of these devices, and every mobile device user is likely to have downloaded an app at some point (Mansour, 2016). These apps may provide services related to the weather, health, communications, education, GPS, games, shopping, music, email, social media, design media, and many others. They have contributed to the popularity and usage of mobile devices, also promising new educational potential as well as offering opportunities for enhancing students’ interaction, engagement, and collaboration (Al-Hunaiyyan et al., 2016). In particular, students download apps that will enable them to access social

media, music, and games, while they primarily use their mobile devices in their houses, at university, or in their cars (Christou, 2014). Additionally, apps offer many new learning and teaching options (Hosseini et al., 2015), which include presentation and assessment tools for higher education. This can motivate and support students in the classroom and lecture hall (Pimmer et al., 2016). Further, a need arises to conduct specific research regarding the effect of using mobile devices on students' academic performance (Mansour, 2016).

It is estimated that most mobile device users are likely to have utilised as many as 25 apps, most of them relating to social media (Mansour, 2016). Another study has revealed that social media apps, such as Twitter, Facebook, and Instagram, and communication apps, such as Skype and WhatsApp, are most commonly used by students (Middelweerd, van der Laan, van Stralen, Mollee, Stuij, te Velde & Brug, 2015). Social media also plays an important part in the technology employed in blended mobile learning, and therefore, its perception by the students has been significantly studied. In a study by Alamri et al. (2019), the positive perception of social media and its effects on education was identified. Specifically, it was established that the students who constructively use social media had better grade point averages (GPA). Markedly, WhatsApp was pointed out to be the app that most students liked and used in Saudi Arabia. Like the above researchers, Alshehri and Lally (2019) discovered that social media was popular amongst Saudi students and its importance in supporting their academics was noted. Concurring with Alamri's findings, Anas (2020) established that WhatsApp was commonly used in the country, while other apps, especially Facebook, were least depended on for academics. Hence, WhatsApp has been recently proved by researchers to be a foremost social media platform supporting blended learning, since it can be used to share large files and add students into groups. In the other two studies that preceded those of Alshehri et al. and Alamri, WhatsApp stood out as the most used app amongst Saudi Arabian students and academic staff. Alshammari, Parkes and Adlington (2017) extensively investigated how WhatsApp may be instrumental in teaching EFL. The main finding in this study was that the apps played important roles in enabling the students to practice the English language through their messages to their classmates. Particularly, it was noted that the app is useful in the peer development of languages, with the teacher only acting as a facilitator. Then again in 2018, Alqahtani et al. looked into the

importance of WhatsApp in boosting learning EFL. Considering this, the main finding was that the students relied on the app to share learning materials and support one another in the learning process. YouTube was also found to be instrumental in blended learning, especially when learning new languages (Alshahrani, 2018). Apart from that, Bin-jomman and Al-Khattabi (2018) as well as Alzahrani (2017) found that technology was being used to improve students' academic performance.

In fact, mobile devices, their apps, cloud technologies, and social networking platforms connect people socially in new and unforeseen ways, thereby allowing the sharing of information, content, and media while the user is mobile or 'on the move' (Lai et al., 2013; Biswas et al., 2020). In addition, they have changed the way people learn, build their knowledge, and spend their leisure time (Lai et al., 2013; Crompton et al., 2019). Some of the advantages of mobile social media apps include enhancing collaborative learning, optimising learners' constant connectivity, and creating customised authentic learning (Hosseini et al., 2015). Nevertheless, the design and development of a mobile learning app is likely to be faced with numerous challenges, such as the need to ensure usability, timely technology, pedagogy, a wealth of learning content, and the imperativeness to consider the learner's experience (Dirin et al., 2017).

Mobile Learning in Higher Education

Over the past few years, mobile devices have become increasingly common in college and universities in the KSA (Nuñez, 2019). They have continued to significantly change education, especially higher education (Moreira et al., 2018). In fact, mobile learning has become an important factor of higher education, and every student owns one or more mobile devices these days (Klimova & Poulouva, 2016). Furthermore, mobile learning is attracting a great deal of academic and public attention, especially in the sphere of higher education (Pimmer et al., 2016). Moreover, due to the increasing use of mobile devices, the opportunity to learn at any time and in any location is considered significant for lifelong learning as it gives access to learning resources (Nassuora, 2012). Crompton et al. (2019) claims that these devices can support lifelong learning by providing convenient sources of information, accompanying people in their everyday experiences, and easing the process of communication. Despite these advantages and students' demand for more flexibility,

alternative modes of information delivery, and more multimedia-enriched and interactive course materials in the classroom, mobile devices remain prohibited in many HEIs (Lam et al., 2011). Students are increasingly using digital tools and devices to share knowledge in new ways (Looney & Sheehan, 2001). Moreover, students in higher education believe that mobile learning is more enjoyable than traditional learning methods (Bhovi, 2018). Research on mobile learning in higher education reveals an increase in the use of mobile technologies, in line with the educational mission (Al-Emran et al., 2016). Therefore, educators need to start developing their pedagogical strategies accordingly and change their views on the use of technology in the classroom.

In addition, mobile technologies have become more or less ubiquitous, and due to their portability, they enable students rapid and unrestricted access to educational content, often free of charge. College students frequently use mobile learning technology in the form of small devices, such as smartphones, e-book readers, MP3 and other portable media players, and tablets. Most students are eager to own these devices and utilise the latest technology to coordinate and socially interact with others. This change in the nature of student behaviour has encouraged enlightened researchers and educators to blend the traditional approach with the modern approach in learning environments. In particular, they seek to take advantage of mobile technologies, which will inevitably affect the students, teachers, curricula, and those who are interested to explore how these devices can be used to learn more effectively.

A study conducted on 450 medical students in India reported that most of the students mainly used mobile smartphones for the purpose of communication, entertainment, and informal learning (Subhash et al., 2015). Subhash et al. (2015) posit that the next step is anticipated to be the adoption of mobile technologies in education. Nassuora (2012) illustrates the many advantages of mobile devices in higher education, which could encourage the adoption of mobile learning in that context. Due to the portability of mobile devices, students can interact more easily than when they are seated behind a large monitor. A large number of learners can access mobile learning, since using a stylus or finger to write or operate a device is easier than using a keyboard or mouse. Further, the relative low cost of mobile devices helps alleviate the potential digital divide (Nassuora, 2013).

The main goal in adopting mobile learning in higher education is to use technology as a useful supportive tool for education (Fayyoubi, Mohammad & Faris, 2013). Saudi higher education students, living and studying in the UK, generally believe that they can achieve personal educational goals in this way. Further, they are also of the opinion that using their mobile devices in the classroom or lecture hall expedites and facilitates their learning (Almutairy et al., 2015). Thus, educators can use mobile technology to open up new learning avenues and construct course material (Briz-Ponce et al., 2017).

The role played by mobile devices, e-learning, and online programmes has also been broadly studied in Saudi Arabia. According to Alshammari (2020), mobile devices are unofficially used by students to support their academic activities. Equally, García-Martínez Fernández-Batanero, Cobos Sanchiz and Luque de La Rosa (2019) learned that mobile learning in some schools in Saudi Arabia had contributed to better academic performance. In another research by Mallick (2020), e-learning and mobile learning was validated by both the students and the tutors as capable of improving the academic results when used concurrently with the F2F teaching and learning methodologies.

Perceptions of Mobile Learning in Saudi Arabia

In the last few years, a number of studies conducted in Saudi Arabia have explored students' acceptance of and readiness for mobile learning. In this section, many of these studies are reviewed. However, most revealed that the majority of participants were unfamiliar with mobile learning. In other words, there is inaction concerning the adoption of mobile learning in Saudi formal education. Therefore, this study, similar to the previous research, has the underlying aim of encouraging educators to adopt mobile learning in the classroom to deliver meaningful education. In the following paragraphs, most of the studies conducted in Saudi Arabia on the topic of mobile learning are mentioned.

In 2009, the first study on this subject was conducted in the KSA using a questionnaire administered to 186 female students at King Saud University, Riyadh. This study reported an increased use of mobile technologies in the past decade. In addition, it was found that the sampled students believe in the potential of mobile

learning to increase flexibility in accessing learning materials and resources. Thus, it could be used to engage learners as well as encourage them to learn independently, anytime and anywhere (Al-Fahad, 2009).

A study conducted at Al-Faisal University, Riyadh, found that all the students who participated in the study owned at least one mobile device. However, only 14% were familiar with the concept of 'mobile learning'. Nevertheless, most of the participants expressed an interest in mobile learning, and a high level of acceptance of its use to facilitate the education process was observed (Nassuora, 2013).

Another study including 390 Arab students and lecturers from three different countries (namely the United Arab Emirates, Saudi Arabia, and Jordan) and exploring their perceptions concerning mobile learning showed that the participants equated mobile learning with technology (Fayyoumi et al., 2013).

Although more than a decade has passed since mobile learning received the attention of educators worldwide, only a few studies have explored the perceptions and understanding of mobile learning in the KSA. These studies showed a positive perception and attitude of students towards mobile learning but did not show their perceptions of using mobile learning in formal blended learning environments (Alharbi et al., 2017).

Acceptance of Mobile Learning in Saudi Arabia

The implementation of mobile learning in higher education is largely determined by learners' acceptance of the requisite new technology (Abu-Al-Aish et al., 2013). The acceptance of mobile learning by learners and educators is, therefore, significant for ascertaining their readiness to adopt mobile learning (Al-Emran et al., 2016). In turn, the acceptance of mobile learning by teachers and students can determine the successful adoption of a mobile learning system (Wang, Wu, & Wang, 2009; Almaiah et al., 2019). According to Alowayr and McCrindle (2016), the KSA is similar to many developing countries wherein mobile devices are the main communication tool available to the people. To elaborate, it is also considered a channel that facilitates access to learning opportunities.

A study conducted at Albaha University, KSA, found that most of the sampled students found mobile learning convenient (Alowayr et al., 2016). Meanwhile, the findings of a survey conducted in Najran, KSA, revealed that all the participating undergraduates owned mobile phones and most of them were familiar with using them for mobile learning. In addition, 83% of the students wanted their teachers to create a blended learning environment, where mobile learning would be integrated with traditional classroom teaching (Chanchary & Islam, 2011).

Another study conducted by Narayanasamy and Mohamed (2013) in Jizan shows that almost all the sampled students were excited to use mobile services for education, such as completing course registrations, accessing course timetables, receiving updates, downloading learning materials, and viewing their grades. Meanwhile, a study conducted in 2012 at Al-Faisal University including 80 students shows a very high level of mobile learning acceptance (Nassuora, 2012).

Tayan (2017) conducted a study with Saudi business school students concerning their attitudes towards and perceptions of a mobile-assisted language learning programme. The study also examined the participants' willingness to support and engage with the programme, whereby it was found that both teachers and students expressed clearly positive views on mobile learning. The same study demonstrated that 65% of the participants used their mobile devices at the university regularly during the day, whereas 86% of the participants confirmed that they had experience of downloading apps on their mobile devices for the purpose of language education. In conclusion, the study found that 85% of the participants agreed that they would be comfortable using mobile learning in the classroom (Tayan, 2017). Furthermore, a qualitative study was conducted on the acceptance of and intention of using mobile learning in the KSA. It included 1203 college students, of which 612 were females and 591 were males. The findings of the study indicate that social influence was the reason some students accepted mobile learning, especially males (Alasmari & Zhang 2019). A different study including 131 Saudi students studying in the UK shows that the majority of them agreed that they were able to use their mobile devices to obtain knowledge and access resources online (Almutairy et al., 2015).

As a matter of fact, many Saudi students study abroad, and there is a great deal of research interest in them. For example, a researcher explored the readiness for

mobile learning amongst Saudi students studying in the UK (Almutairy et al., 2015). The findings reveal that most of these participants accepted mobile learning in formal education, believing that it facilitates knowledge acquisition. The students were confident about using mobile devices for learning and education (Almutairy et al., 2015).

A study conducted by Badwelan et al. (2016) found that learners' acceptance of mobile learning depends on lecturers' acceptance, their motivation for adopting mobile devices in education, and their experience of using mobile technologies. An empirical study conducted by Aljuaid, Alzahrani and Islam (2014) in Taif University suggests that learner's acceptance of mobile learning depends on lecturers' readiness to take advantage of this form of learning. They appeared to have the intention of adopting mobile learning in their teaching to obtain knowledge and information about teaching, interact with their students, download or upload teaching resources and materials, and conduct research and academic work (Aljuaid et al., 2014). Al-Shehri (2013) also reports that platforms have been established by Saudi universities as channels of communication via social media, in order to interact with students. In his review, he found that the main studies on mobile learning in Saudi Arabia show positive attitudes to the adoption of mobile learning in formal education. Nevertheless, learners do not appear to have fully understood the potential of mobile learning (Al-Shehri, 2013). To illustrate this further, one study conducted at the Saudi Electronic University, which included 400 distance learners, reveals that the majority believed in the potential of mobile learning to improve their learning performance, despite the fact that they did not find mobile learning easy to carry forward; they rather required a great deal of effort (Badwelan et al., 2016).

Nevertheless, Saudi students tend to carry their mobile devices around with them at home, university, and work and seem to have the confidence to use them as a learning tool, since they generally believe that mobile learning will provide new ways of acquiring knowledge and can save time (Almutairy et al., 2015). In a study that investigated over 425 male university students on a preparatory year in Saudi Arabia, positive attitudes were evident towards the adoption of mobile learning. Moreover, the participants favoured learning from their mobile devices as opposed to computers,

with the belief that mobile devices allowed them to access learning content more quickly, more often, and in a way that was more fun (Alshammari et al., 2018).

Recently, a study conducted on the uptake of mobile learning in the education system of Middle Eastern countries, especially Saudi Arabia and Iraq, suggests that students had low use for it for education. They cited trust and cost as the major reasons for poor motivation in using technology to study (Al-Azawei & Alowayr, 2020).

Mobile Learning and Collaborative Learning

One main benefit of mobile learning is that it permits students to work collaboratively, so that they can interact with each other via wireless networks such as Bluetooth (Hashmi et al., 2011). When one student uses a mobile device to create video materials and another uses one to test their vocabulary, both events may be referred to as 'mobile learning' (Pimmer et al., 2016). The above researchers add that the underlying theories and associated activities of mobile learning are diverse and can result in different methods of education, varying forms of student engagement, and a range of educational outcomes (Pimmer et al., 2016). Collaborative learning is reported as important to the accessibility of knowledge for students, created through information sharing, support for interpersonal interaction, and the freedom to explore (Briz-Ponce et al., 2017). In such a context, mobile devices are portable tools for information sharing and communication (Crompton et al., 2019).

Mobile devices include smartphones, small portable laptops, tablets, smart watches, and other small smart touchscreen devices, which can foster collaborative learning (Jaldemark, Hrastinski, Olofsson, & Öberg 2018). Mobile learning encourages students to collaborate and share ideas via the internet and mobile technologies (Al-Emran et al., 2016). In fact, mobile learning helps improve communication between learners and enables collaborative learning (Alharbi et al., 2014). To enhance the learning experience, educators often investigate opportunities to blend mobile learning with collaborative learning environments these days (Heflin et al., 2017). Furthermore, mobile technologies facilitate collaboration between students and the sharing of ideas online through the latest technology (Hamidi et al., 2018).

By using mobile devices, collaborative learning takes place both formally and informally (Jaldemark et al., 2018). Learners are connected within the same

coordinates of time and space, but they are likely to have different levels of access. However, because mobile devices can be distracting to students, educators need to be selective about using mobile technologies to encourage collaborative learning (Heflin et al., 2017). Nevertheless, mobile learning has many useful virtues and uses, such as portability, communication, connection via the internet or other network, the opportunity to acquire the 21st century learning skills, components of the smart classroom, and the facilities for collaborative learning and interactive education (Al-Hunaiyyan et al., 2017).

Indeed, social-constructivist pedagogical approaches can be enhanced by adopting mobile learning for both teaching and learning, because of the capacity of mobile technologies to provide channels of communication and interaction (Briz-Ponce et al., 2017). Online social and learning applications as well as mobile tools can create an interactive, collaborative, and innovative learning environment (Al-Hunaiyyan et al., 2017).

Potential Challenges and Barriers of Mobile Learning

There are six main challenges that face the adoption of mobile learning. For example, a lack of time and relevant knowledge for its use can be important barriers to students using mobile technology (Subhash et al., 2015). In addition, lack of awareness, dearth of motivation, certain socio-cultural factors, and negative perceptions have all been listed as challenges to mobile learning (Hamidi et al., 2018). In the following subsections, some of these challenges and barriers are explained in more detail.

1. Social and cultural challenges

Cultural and social issues have a visible impact on the adoption of mobile learning (Al-Hunaiyyan et al., 2017). In a study conducted on 165 female faculty members at King Abdulaziz University in Jeddah, two main factors were identified as affecting the use of mobile learning: resistance to change and socio-cultural norms (Alfarani, 2014). In addition, a qualitative study was conducted on the challenges and prospects of mobile learning in higher education. In this study, 110 educators and 499 students were utilised. They stated that mobile learning enhanced education but was also fraught with social and cultural barriers (Alhajri, 2016).

One of the problems that arises in terms of accepting mobile learning in the classroom is the use of mobile devices with in-built cameras (Alfarani, 2014). On account of the religion, culture, and norms in Saudi Arabia, many female students are covering a part or the entirety of their bodies and faces; however, the use of cameras inside the building occupied by female students is against the law. Consequently, mobiles with cameras were forbidden for a long time until a new law came into place that imposed deterrent penalties for filming other people inside educational institutions.

2. Resistance to change

In 2014, a study was conducted at King Abdulaziz University in Jeddah, Saudi Arabia, where it was found that educators' attitudes were negative and showed resistance to change. This was despite them realising the benefits of mobile learning, such as the better exchange of resources and efficient communication with students. The age of participating educators and their years of experience were noticeable factors of their acceptance, since the above study reports that older and more experienced Saudi educators tended to be more resistant to change (Alfarani, 2014). Moreover, older Arab lecturers were generally reluctant to accept mobile learning (Fayyouni et al., 2013; Al-Hujran, Al-Lozi & Al-Debei, 2014).

3. Teachers' skills

Some researchers have clarified that there is a knowledge gap amongst educators in higher education, which prevents them from understanding the digital language of their students (Moreira et al., 2018), although teachers with fewer years of teaching experience tend to be readier to integrate mobile learning into education (Christensen & Knezek, 2018).

Al-Hunaiyyan et al. (2017) state that it is important for the instructor to have control and show effective management over the learning process, when attempting to blend mobile learning with formal education. They emphasise the significance of managing learning activities, such as assignments, announcements, evaluation, and feedback. The instructor can guide and assess their students in building and sharing information, using mobile social networking services, applications, and tools (Al-Hunaiyyan et al., 2017).

However, there is also a need to provide educators with supportive training in the integration of mobile devices and management strategies, which will enable them to feel confident about this approach in the classroom or lecture hall (Christensen et al., 2018), although some educators claim that they can blend mobile learning effectively into their classrooms without training (Moreira et al., 2018). Nevertheless, low computer literacy amongst lecturers still appears to be a barrier to the adoption and popularisation of mobile learning in Arab countries (Fayyoubi et al., 2013).

4. Technical issues

Limited memory, small screens, low processing power, weak internet connection, and short battery life are listed as constraints to the adoption of mobile learning (Koole et al., 2010; Hashmi et al., 2011; Moreira et al., 2018). In fact, many researchers agree that the adoption of mobile devices in education is associated with challenges such as having to work on a small display screen with small keyboards and low memory (Dirin et al., 2017). Most mobile devices have the flaw of a short battery life (Hashemi et al., 2011), meaning that batteries have to be recharged regularly, with data being lost if not backed up properly. In addition, the rapid development of the fast-moving mobile device market leads to the obsolescence of these devices within relatively short periods of time (Hashmi et al., 2011).

5. Slower adaptors and issues over access to technology and networks

Students' ability to cover internet connection costs for their mobile devices as well as contend with the availability of networks works especially as an important determinant to be considered by teachers (Koole et al., 2010). Damodaran and Burrows (2017) have identified slower adaptors as a group who have problems accessing technology. These individuals are more likely to live in social housing, earn lower wages, have disabilities, live in rural areas, and be homeless or insecurely housed. They are also more likely to be older—or else younger—but unemployed and not enrolled in any education or training programme. As a result, they may not have any access to computers, mobile devices, or broadband at home and will consequently lack the minimum digital skills that are required to undertake mobile learning or other computer-mediated tasks, thereby placing them at a disadvantage (Damodaran et al., 2017).

6. Gender issues

Female students have been found to use mobile smartphone technologies and the internet more frequently than their male counterparts (Subhash et al., 2015). Moreover, a study on collaborative learning based on mobile technologies, using a sample of 450 medical students in India, reveals that female students tend to spend more time than male students using mobile apps. It has been deduced that mobile technologies increase female performance and interaction in collaborative group learning, which reduces the gender gap in education (Briz-Ponce et al., 2017).

When educators understand the gender differences between students in a learning context where mobile technology is used, they can design, encourage, and improve students' learning experience (Briz-Ponce et al., 2017). The above researchers list a number of these observed differences. For example, female students tend to ask more questions, listen actively, and encourage input from others to build relationships reaching a consensus. Conversely, male students tend to dominate conversations, boast about their achievements, and interrupt others to preserve their status or gain one. The above researchers, therefore, conclude that mobile devices can be used to level the playing field in collaborative learning environments (Briz-Ponce et al., 2017). The following table lists the main challenges of adopting mobile learning and how they are related to this study.

Challenges	Related points
Social and cultural challenges	It is important to investigate the role of norms and culture and whether they could be barriers in the implementation of blended mobile learning.
Resistance to change	This challenge will be explored in this study.
Teachers' skills	For this challenge, the lecturers' opinions were included.
Technical issues	This challenge will be addressed by knowing the participants' views concerning the facilities available.

Slower adaptors and issues	This challenge is very important, because this study focusses on the BYOD strategy. Hence, I held face-to-face meetings with most of the participants, asking them to participate in the study. After obtaining consent, I provided them the survey link to see if there were some with no access to the internet or a mobile device.
Gender issues	This study does not focus on gender issues.

Table 1 Main challenges associated with this study

Part C: Using Mobile Devices in Blended Learning and Formal Education

Over the next decade, it is foreseen that mobile devices will play a significant role in classrooms (Wang et al., 2008), but at present, it is in the early stages of its application in formal education. Blended learning and the adoption of technology in learning environments play a significant role in enhancing educational effectiveness, as several researchers have pointed out the positive relationship between the adoption of technology in learning settings and students' academic performance (Alfarani, 2015). For example, in 2013, a survey involving 90 higher education teachers in Arab countries reveals that these teachers preferred to combine mobile learning with traditional teaching and evaluation methods. They argued in favour of the human factor as well as for the importance of using new mobile technology (Fayyumi et al., 2013). Portable mobile devices and their technologies were acknowledged as providing options for implementing interesting new learning methods, which could be utilised both within and outside the classroom (Almutairy et al., 2015). The blend of mobile learning in education is, therefore, considered as an alternative to enhance students' interest and motivation (Hashmi et al., 2011; Rahamat et al., 2017). In fact, mobile devices and their features not only help shape new knowledge and methods of accessing it but also define new kinds of art and performance, with novel ways of accessing them (Traxler, 2007). According to Huang, Huang, and Hsieh (2008), mobile learning provides an environment with features that include increased availability and

accessibility of information, with rapid and easy delivery of content. Moreover, Savill-Smith, Attewell, and Stead (2006) illustrate that mobile learning is important for introducing new and useful technologies into the classroom, where they can be utilised as part of a learning approach involving other types of activity, especially to promote learners' interaction and collaboration.

Nikana (2000) identifies many benefits of mobile devices in the classroom. For instance, it increases students' depth of knowledge and understanding of material and curricula. Nikana (2000) adds that the use of mobile devices can enhance students' motivation through certain applications, whereby students participate in group discussions and receive prompt and effective feedback from peers and teachers. In addition, mobile learning supports the learning process by assisting students with various individual and special needs (Savill-Smith et al., 2006). Meanwhile, Hashmi et al. (2011) explain that because of their small size, light weight, portability, and adaptable features, mobile devices are easy to use, especially for learners with special needs. For example, text can be converted to speech and vice versa (Hashmi et al., 2011).

Numerous studies have explained the positive effects of educational technology in the classroom. Some of them have shown that technology improves students' achievement and develops their learning behaviour (Carlson, 2002; Kolar, Sabatini & Fink, 2002). Meanwhile, Ooms, Linsey, Webb, and Panayiotidis (2008) report that employing mobile technology in a learning environment can improve interaction, skills, and achievement for both teachers and students. Furthermore, mobile devices ease interaction and communication between students and teachers (Khaddage, Lanham & Zhou, 2009), enabling learning and information exchange outside the classroom (Lam, Wong, Cheng, Ho & Yuen, 2011).

Likewise, Pimmer (2016) states that using social media apps on mobile phones facilitates access to information, latest ideas, and learning opportunities for both individuals and organisations. He claims that this plays an important role in reinforcing communication between individuals with otherwise weak ties. Social networks can blend F2F education and online distance education, which significantly blurs the boundary between what takes place inside and outside the classroom and learning new skills for leisure (Borba et al., 2016). Pimmer et al. (2016) reviewed the potential

of mobile technology apps in higher education to enhance students' practice and motivate them inside and outside the classroom. Moreover, knowledge of formal learning environments can be integrated with informal learning practice this way (Pimmer et al., 2016).

Aside from the above and according to numerous studies, there are even significant benefits to be gained from using mobile learning within the classroom. For instance, it can facilitate access to data, information, and resources while making assessment and the delivery of feedback easier. It provides self-study options and enables participation in virtual learning environments (VLEs) (Jacob & Issac, 2008; Hashemi et al., 2011). However, there are still some researchers who conclude that the effect of technology on student performance and achievement is insignificant (Kinlaw, 2003; Avers, 2004).

Adapting to Mobile Learning in Blended Learning and Formal Education

Many educators are beginning to adopt mobile learning in universities, schools, and training institutes (Kukulka-Hulme et al., 2005). Mobile learning is mainly based on telecommunications so that students can have free access to educational materials, lectures, and seminars anytime and anywhere, whether inside or outside the classroom (Trifonova & Ronchetti, 2006). It creates a learning environment within the framework of new educational situations based on participatory and interactive learning, facilitating ease of information exchange amongst students and between them and their teachers.

Tayan (2017) emphasised that the adoption of mobile learning in higher education has many benefits, such as enhancing learners' motivation, improving learning quality, increasing students' autonomy, promoting communication and collaboration between the students themselves, and encouraging communication between students and teachers. Some mobile learning studies have reinforced the significant benefits of mobile learning for education, including building and increasing competencies, creativity, collaboration, and interaction amongst students in a learning environment (Al-Hunaiyyan et al., 2017). Thus, researchers now need to focus on combining mobile devices and their unique features with instructional methods and strategies to resolve contemporary pedagogical problems (Sung, Chang & Liu, 2016).

In brief, the implementation of mobile devices in education takes many different forms, ranging from mobile devices provided to all students by the institutions involved to a BYOD arrangement (Christensen et al., 2018).

Studies on Blended Mobile Learning

Year	Number of publishing papers
2007 and before	0
2008	2
2009	5
2010	3
2011	6
2012	7
2013	11
2014	8
2015	12
2016	13
2017	14
2018	13

Table 2 Results of keyword search per year

Table 2 shows the number of articles and papers (written in English), where the words 'mobile' and 'blended' appear in the title.

As previously explained, the use of mobile learning in a blended learning environment will be called 'blended mobile learning' in this thesis. In the following paragraphs, I will explore the development of blended mobile learning by reviewing some articles on this topic. It was found that the first study mentioning this concept was conducted in 2008, consisting of a case study using mobile learning as a solution to the lack of interactivity on a blended learning course. Wang and Shen (2008) conducted a study at a large university in China, examining the effects of a blended mobile course on students. The purpose of this specially designed course was to

address the lack of interaction between students on a blended learning programme, which comprised live broadcasts in classrooms at Shanghai's Jiaotong University. Here, the instructors and instructional designers developed a mobile learning system with tools for a blended learning course, in which the instructor would teach in a blended classroom environment. To elaborate, the instructor used a computer screen to support their handwriting, which was then uploaded and streamed as a live video, accessible on students' mobile devices off campus at the actual time of the class. This live streaming enabled students to be supervised and increased interactivity between them and their instructor outside the classroom. The students were also able to send their instructor text messages. Apart from this, recordings of the lectures were available for the students to listen to. This system was applied on English and Computer Science courses for approximately 1000 students. The authors described this use of a mobile learning system in a blended learning environment as 'persuasive technology'. The results show positive effects on learning as well as converting passive learning via traditional, online, and blended methods to active learning in a blended mobile learning system. In addition, the use of a mobile learning approach, such as live broadcasts and interactive text messages, on blended courses was suitable for text-based interaction. Finally, it encouraged student engagement in the learning process from a cognitive, social, and emotive perspective (Wang et al., 2008).

Another study was conducted at the same university by Wang et al. (2008) on a course that used the same blended mobile system, consisting of 245 student surveys. The researchers conclude that student satisfaction in the classroom was important for the successful application of blended mobile learning, otherwise students would eventually stop engaging with the courses if they are not satisfied. Thus, designing activities for mobile learning systems requires special attention to the physical limitations of mobile devices. Younger students, known as 'digital natives', were found to be more comfortable and familiar with the virtual realities of mobile devices used for messaging or playing online games as compared to older learners, known as 'digital immigrants', who tended to favour F2F learning. Furthermore, the researchers recognised that demographic information gathered in a survey can be used to identify certain age groups that feel more comfortable in mobile learning environments (Wang et al., 2008).

In 2009, more research was performed on the introduction of a blended learning and teaching model. For example, one article presented a system called MILE (Mobile and Interactive Learning Environment), which was designed as a distributed learning network with the aim of adopting mobile devices in an educational environment, so as to develop interaction and collaboration. Both students and teachers were able to use this network via mobile devices, thereby supporting learning while being mobile (Boticki, Hoic-Bozic & Budiscak, 2009).

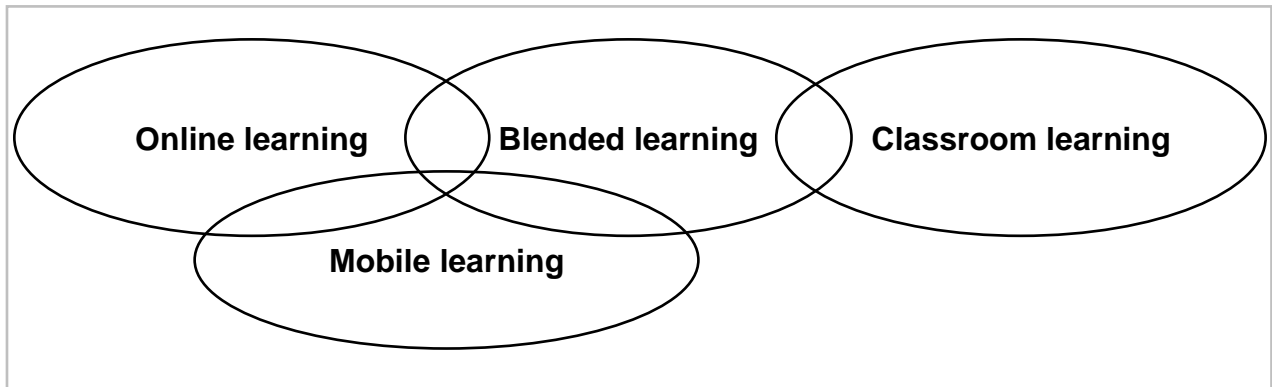


Figure 13 Blended mobile learning model (Khaddage & Zhou, 2009)

Khaddage et al. (2009) proposed a blended mobile learning model to use with mobile devices in HEIs. This model integrates traditional learning into web-based learning environments. Khaddage et al. (2009) claim that blended mobile learning supports flexible, effective, efficient, and collaborative learning. They also highlight the additional benefits of using mobile devices in blended learning environments, such as the ability to take pictures of learning content in the classroom and record events on mobile devices. Conversely, outside educational institutes, mobile devices allow students to text each other and communicate and interact with each other or with their instructors. In addition, students can use their mobile devices off campus to remotely access course content and resources. Furthermore, Bluetooth can be used to share learning content, such as images, documents, and presentations. There is a frequent claim that the advantage of blended mobile learning includes being able to control and lead one's own learning. Therefore, students can learn 'on the go', using highly accessible learning content and resources. Mobile learning also ensures personal and private learning, with prompt responses and feedback. Nevertheless, the above authors cite some of the limitations of blended mobile learning, such as high running costs; heavy reliance on technology; networking issues, such as the lack of coverage;

problems with downloading; and lacking storage capacity. Nevertheless, they specifically look forward to the development of teaching and learning in HEIs, away from the traditional blended learning models towards a blended mobile learning model (Khaddage et al., 2009).

That same year, another study was conducted on a blended mobile course, based on podcasts accessed with mobile device apps (Morisse, Ramm, Schüler & Wichelhaus, 2009). A sample of 58 students (20 undergraduates, 38 students from the Media Informatics Diploma programme) attended a design course, which consisted of four learning components. The first component was scheduled as 40 podcast episodes to be downloaded from Apple iTunes. Each of these podcasts referenced a PDF document, which contained more detailed content. This document was accessible to students at any time and from anywhere. The second component consisted of F2F weekly meetings, aimed at supporting the learning process via discussions, enabling clarification of any ambiguities, and providing an introduction to practical issues. Third, there was an online assessment test consisting of 10–20 questions after each podcast. This part was designed as an optional means for the student to gain extra marks towards the final exam. Finally, the last part of the course involved an F2F lecture on theory, accompanied by lab hours, where the students worked on a media project in groups. The course then ended with a written exam. In addition, the students were observed in class, and 24 students completed questionnaires made up of 10 questions on the usefulness of podcast learning for enhancing individualised learning. This is because the student could choose the most convenient place, time, duration, and method at their discretion. In addition, the capacity to replay podcasts and take breaks was found to support students' learning. Likewise, the students in the above study emphasised the advantages of podcasts and electronic content for conducting research or listening to the content again, which is not possible with a traditional lecture. Moreover, students were able to resolve any problems that they faced, using internet and media sources. Communication between the students and the lecturer and amongst students themselves during F2F sessions was important for understanding context. The students commented that the course was interesting and different, which motivated them and consequently improved their learning performance. However, the above authors also mention that the blended

mobile teaching method requires a higher degree of self-responsibility from students (Morisse et al., 2009).

In 2010, a six-month study was carried out at London Metropolitan University, using TxtTools in a blended mobile learning environment (Bradley, Weiss, Davies & Holley, 2010). TxtTools is an online application that allows students to send text messages anonymously via their mobile devices, which can then be viewed on a PC by a lecturer. These text messages could take the form of comments, questions, or opinions sent by students before, during, or after a lecture. The above study aims to measure the effect of this intervention on student engagement and how it supported teaching and learning. It reports significant positive feedback from students, who claimed that they enjoyed using the new technology, seeing it as a contemporary and novel learning experience. They also found it easy and fast for sharing their responses, particularly with large groups. Furthermore, the lecturers found it to be a versatile system that was equally easy to use. In their view, it enhanced communication with their students and increased interaction in the classroom. Finally, the researchers conclude that students' use of mobile technologies for sending messages represents an opportunity for those who are less confident to engage and participate more in lectures.

Furthermore, a study was conducted in 2011 focussing on the efficacy of blended learning (Brand, Kinash, Mathew & Kordyban, 2011) using mobile devices (such as iPads) and tools (such as e-textbooks and the Blackboard application); the participating students revealed positive attitudes to blended mobile learning. Nevertheless, they were not convinced that blended mobile learning made any real difference to their learning, learning habits, and motivation. In the above-mentioned study, 135 undergraduates participated in a course that ran for two semesters from 2010–2011. Its pedagogical design combined F2F lectures and discussions with online learning. Students were allowed to use their own mobile devices to access the learning content. Moreover, although the use of iPads was not compulsory, a loan scheme was set up to provide them pre-loaded with e-textbooks and the Blackboard app, thereby guaranteeing that every student had use of an appropriate mobile device. During the loan period, which was for one week on two occasions during the semester, the students were allowed to use iPad devices in both informal and formal learning

settings. They were also free to download apps and take these devices wherever they wanted. The results reveal that the students' attitude to blended mobile learning was warm and enthusiastic, which improved their performance. In fact, the students who borrowed iPads achieved grades that were twice as high as those achieved by their peers who did not. In most cases, the students with iPads used them for the Blackboard app, e-textbook, email, and Facebook, but less than half of the students used them for notes or to install apps.

In addition, Ono, Ishihara, and Yamashiro (2012) examined the effect of applying mobile blended instruction in the foreign language teaching, with regard to learners' attitudes. They considered the presentation of blended mobile learning as a new pedagogical teaching model, describing it as a blend of traditional F2F lectures with iPod Touch activities. The participants consisted of 76 college students, who were delivered an English reading course for six weeks. None of the students were familiar with iPod Touch devices; additionally, none of them had ever used any mobile tools to learn English. The iPod Touch activities involved reading aloud and silently, group work, and short tests. Two surveys were also conducted: one before the course and one at the end. The study results show that the effective implementation of mobile tools can facilitate the learning process and stimulate students' motivation and understanding of communication strategies (Ono et al., 2012).

Another study (Mayisela, 2013) carried out at a university in rural South Africa explored whether the use of mobile technology in a blended learning course can improve accessibility and communication. The study included 30 Java programming students, and the findings reveal that mobile devices increased learning flexibility in terms of time and place as well as allowed access to social networks such as Facebook. Moreover, mobile learning was found to support individualised learning experiences. Accessing course materials outside the classroom gave students the opportunity to catch up on any classes that they might have missed. The use of mobile devices likewise increased interaction with the course materials. In summation, the students agreed that mobile technology had expanded their opportunities to participate and interact with the online components of their course. However, it was not easy for them to access Blackboard using mobile devices, and the study identifies a digital divide between students with access to mobile devices and those without. The

researchers explain this digital divide as a pattern of unequal access to ICT in a population, which can exist between developed and developing countries and amongst users in different socio-economic groups. They claim that the use of mobile learning technology for blended courses offers a potential solution to the shortage of computers.

Aside from this, the students affirmed that they used Facebook to ask all manner of questions—for example, questions that they would be too shy to ask in an F2F classroom or questions that they did not think of in class. Many of them agreed that Facebook facilitates information sharing with peers and interaction with lecturers, even outside class time. It also improved their online communication. Similarly, one lecturer who was interviewed confirmed the increase in student interaction and stated that the students received immediate responses wherever and whenever necessary, with no need for additional classroom time. The lecturer realised that the use of mobile learning on the course had enhanced students' participation and increased opportunities for mentoring them. Nevertheless, he also cited a number of disadvantages, such as how busy he had become in answering all the students' queries. That said, however, he approved of the fact that Facebook had elicited students' enthusiasm to participate and enhanced their performance in tests. Overall, he claimed that the use of social networks had improved students' communication and collaboration on the blended mobile learning course.

In a study conducted by Hou, Sheng-Yi, Peng-Chun, Yao-Ting, Lin and Chang (2014), a blended mobile learning environment for museum-based learning was explored, with 58 college students divided into three groups. This study used mixed research methods, including observation, pre-tests, and post-tests, to measure the differences between three blended learning modes. The first group undertook a traditional museum visit; the second, paper-based task sheets during museum visits; and the third, mobile interactive learning during their museum visits. All three blended learning modes were accompanied by a learning website, which could be accessed either at home or at school. The results show that the third group had acquired significantly more knowledge than the first. In addition, the participation of the third group was greater than that of the other two groups. The third group had the chance

to spend more time on the website, learning via mobile tools. Moreover, the participants in the third group paid more attention than those of the other groups.

Meanwhile, Xu, Fang, Qing, and Zhang (2017) set up blended mobile teaching practice on a medical course to reflect students' learning situations. They subsequently identified that timely and appropriate evaluation and feedback for students' learning activities supported guidance, increased enthusiasm, assisted with corrective action, and enhanced the learning effect. This led to better autonomous and collaborative learning amongst the students and effectively improved their knowledge and skills.

In the course of teaching EFL, 85 students at the Foundation University in Istanbul participated in a study that aimed to investigate the effect of using WhatsApp as a learning tool in a blended mobile learning course (Avci & Adiguzel, 2017). The lecturer used WhatsApp chat groups to enable the students to practice their English and complete assigned tasks in groups. The lecturer was the administrator for all the groups and facilitated the learning process—providing essential information, answering any questions, and giving immediate feedback. The course consisted of F2F in-class lectures and online practice via WhatsApp. Besides the data collected from students' interviews, the study used mixed methods, peer evaluation forms, and WhatsApp chat files. Most of the students' views on this blended mobile learning course were very positive; they highlighted many advantages that had made a difference to their learning. For example, they mentioned that the course had developed and enhanced their interpersonal and communication skills and enabled this development to continue. Thus, they stated a preference for mobile tools as a means of practicing English for real-world purposes, collaborating with peers, learning through interaction, taking responsibility for their own learning, managing their study time, and receiving immediate feedback. The researcher concluded that blended mobile learning facilitated English language learning amongst these students—improving their vocabulary knowledge, enhancing their communication skills, and increasing collaboration in formal and informal settings. In particular, the use of an instant messaging app on an informal platform positively affected their performance and the quality of their learning in the educational environment.

Meanwhile, Soya (2018) summarises the role of mobile technology in enhancing the blended learning environment, identifying four main aspects. First, it offers personalised learning at any time or situation and at the pace of the learner. The use of mobile blended learning can also stimulate enthusiasm and encourage 21st-century students, who may feel bored with a traditional learning approach. Second, mobile learning increases both synchronous and asynchronous collaborative learning. Thus, students can interact with each other remotely via mobile tools and apps to build and share knowledge. Third, mobile tools ease immediate communication between students and instructors and amongst students themselves. Fourth, mobile learning extends the range of blended learning options by offering various new technological tools to attract students and keep them engaged as positive learners in the learning process (Soya, 2018).

The Gap between Everyday Life and the Culture of the Classroom/Lecture Hall

Nowadays, the high global dependence on social networking platforms is changing people's daily lives, as a result of dramatic development in mobile technologies and apps (Lai et al., 2013). However, the popularity and widespread use of mobile devices in students' everyday lives do not correspond to the rate of mobile technology use in education (Kim et al., 2017).

Effect of Blended Mobile Learning on Teaching and Students

Most mobile learning studies confirm the positive effects of using mobile technologies in higher education (Pimmer et al., 2016). For instance, Sung et al. (2016) analysed how previous studies had adopted mobile devices as educational tools, revealing better educational outcomes than those achieved using a laptop or desktop computer. However, Borba et al. (2016) point out that mobile technology has stretched the concept of the classroom to the extent that it is now unpredictable. In fact, mobile devices present users with innumerable options, including the capacity to search and explore the web, cloud storage, messaging tools, social media, file readers, document review, and virtual reality. These functions can be accessed through features, such as touch screens, cameras, capture software, GPS, sensors, media players, and audio-visual recorders, which can all be utilised for education, both within and outside the classroom (Al-Hunaiyyan et al., 2017).

In addition, both students and teachers have been found to display positive attitudes to the use of mobile learning for language acquisition, believing that mobile learning technology can help learners understand and memorise a new language (Wang, 2016). Moreover, mobile learning tends to employ new and enjoyable methods and strategies of teaching and learning, both inside and outside the classroom (Chee et al., 2017).

Similarly, out of 144 mobile learning studies conducted between 2010 and 2015, most concluded that mobile learning had a positive effect on learning (Chee et al., 2017). Nickerson, Rapanta, and Goby (2016), for example, found that a mobile learning intervention in the classroom had a positive impact on students' behaviour, learning, preparation, and engagement with the education process. In this way, students were able to interact with their teachers and peers (Hashmi et al., 2011). Due to the freedom and availability of learning, anywhere at any time, most of the students and instructors perceived mobile learning as an attractive learning method (Al-Hunaiyyan, Alhajri & Al-Sharhan, 2018).

Precisely, successful mobile learning adoption consists of six key components: connectivity, interactive content, content management system (CMS), mobility, collaboration, and learning management system (LMS) (Al-Hunaiyyan et al., 2017). These authors illustrate connectivity as a network that flawlessly connects all types of digital devices. Furthermore, they suggest that interactive content allows students to progress with their learning at a self-selected speed, whether in a group or individually, and in an individualised manner. In addition, they mention the instructors' ability to control an entire class via a well-organised software and hardware, the CMS. The authors explain mobility as a flexible movement of content, students, and instructors while learning in any location at any time. Additionally, collaboration is a vital component that encourages students to participate inside and outside the classroom via social networks as well as create a flexible learning environment. Finally, an LMS can improve learning outcomes and efficiency. Al-Hunaiyyan et al. (2017) specify that the use of mobile technologies enables an instructor to send reminders, messages, homework tasks, and feedback.

Potential Challenges and Barriers to the Adoption of Blended Mobile Learning

Nevertheless, mobile learning is still in its early stages of development (Park, 2011), and there is a lack of awareness and motivation in this regard amongst educators and students (Wang et al., 2009). Consequently, several challenges emerge from the application of mobile learning, such as technical restrictions regarding connectivity, small screen size, restricted memory, and slow network speeds (Haag, 2011; Park, 2011; Aldosemani et al., 2019). There are also further educational issues regarding the adoption of mobile learning in the classroom; for instance, there is the possibility of dispersing the learning process (Park, 2011). The reluctance amongst students and practitioners to use such new devices and technologies may also raise problems, leading to system failure and prejudice in an institute (Davis & Venkatesh, 1996). Therefore, it is essential that users are prepared to apply these new technologies, which may differ from anything that they have used before. However, it is this acceptance that will ultimately ensure the success of a mobile learning system (Wang et al., 2009).

Chanchary et al. (2011) list several other barriers related to mobile devices, such as their limited memory, making it difficult for students to download or save large amounts of data and learning content. Short battery life can also have a negative impact on students' satisfaction with mobile learning via such devices. Moreover, the interfaces of mobile devices are reduced to basic functions, and so, the small screen size may be a further hindrance (Chanchary et al., 2011).

Finally, Al-Hunaiyyan et al. (2018) highlight certain challenges to the use of mobile learning in education, such as design issues, administrative challenges, technical difficulties, assessment capabilities, and cultural impact.

Theoretical Framework

The conceptual framework of the study is the system of theories, concepts, expectations, assumptions, and beliefs that support and inform the research (Maxwell, 2008). This research is influenced by the power of the internet and new mobile technologies and their effects on education. Moreover, it is also influenced by the students' frequency of use with regard to their mobile devices and how much advantage they enjoy from it. Consequently, I considered the connectivism theory as

a perspective that focusses on the era defined by learning through digital communication and mobile technologies. Moreover, I considered the UTAUT as a perspective that explains students' and lecturers' acceptances of blended mobile learning. In the area of predicting users' acceptance of technology, the UTAUT is approved as the most common model that focusses on technical factors for the efficient implementation of information systems (Al-Mamary, Shamsuddin & Aziati, 2015; Almaiah & Alamri, 2019).

1. Connectivism Theory

Connectivism refers to a learning theory for the digital age, which first appeared in 2005 by Siemens, which was then developed by Downes (Goldie, 2016). It is the most suitable learning theory in the digital age, because it has been used to explain the impact of technology on people's everyday lives, how they communicate, and how they learn. It claims that knowledge exists in the world and not merely in the heads of individuals. Considering that, it is suitable for the research topic of blended mobile learning, as this theory supports the incorporation of technological methods into the learning process. Siemens (2004) lists the following principles of connectivism:

1. Learning and knowledge rest in a diversity of opinions.
2. Learning is a process of connecting specialised nodes or information sources.
3. Learning may reside in non-human appliances.
4. The capacity to know more is more critical than what is currently known.
5. Nurturing and maintaining connections are needed to facilitate continual learning.
6. The ability to see connections between fields, ideas, and concepts is a core skill.
7. The currency (accurate, up-to-date knowledge) is the intent of all learning activities in line with connectivism.
8. Decision-making is itself a learning process. Choosing what to learn and the meaning of incoming information are seen through the lens of a shifting reality. While there is a right answer now, it may be wrong tomorrow due to alterations in the information climate affecting the decision.

Connectivism has been criticised as a learning theory. For example, Verhagen (2006) is not convinced about the principle of connectivism that states the learning could reside in non-human appliances (Kop & Hill, 2008). Moreover, some researchers

mention the challenges that may face connectivism. For example, Şahin (2012) argues that it is hard to draw a clear line between the advantages and disadvantages of connectivism, because an advantage in one context could be a disadvantage in another context. He mentions that the tool of connectivism is not limited to the technology known and used today. He adds there could be a risk of increasing addiction to technology and the learners getting isolated from their social life. Further, he claims the educators need expertise in formal education and the learners need it in informal learning. Finally, he states connectivism is dependent on electricity and available sources (Şahin, 2012).

However, as a response for previous claims, Siemens (2006) claims that knowledge exists not only in the mind of the individual, but it exists and is distributed across a network. He adds there is a need for a new learning theory that suits the digital age and the growth of information available on the internet (Siemens, 2006). Moreover, Downes and Siemens think connectivism is not limited to the internet and online environments but that the theory applies to a larger learning environment where online environments are just one of the important applications for the development of this theory (Kop et al., 2008).

Connectivism is the most suitable theory for this research. The knowledge in mobile blended learning is distributed across a network where lecturers, students, mobile devices, and apps are the nodes. One of the mentioned challenges of connectivism is that the tools of connectivism are not limited to the technology people currently know and use. However, the educators in formal education may use available technological tools according to the specific students' needs and ability, because each group of students have different needs than others and each course is different. In fact, massive tools allow lecturers and educators to choose the right tool, but it may give them extra work in choosing the most suitable one. Moreover, the risk of getting addicted to technology was one of the concerns of my study that pushed me to ask participants about spending time with mobile devices. Thus, this study and many studies show that higher education students in this digital age always use their mobile devices. Therefore, this study is focussed on Saudi universities where electricity is available, and its policies encourage lecture training. For previous reasons, connectivism is suited in this study.

2. UTAUT

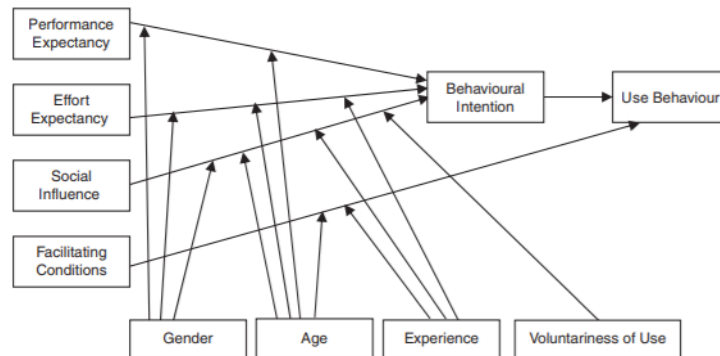


Figure 14 UTAUT Model by Venkatesh et al. (2003)

In 2003, Venkatesh, Morris, Davis, and Davis (2003) developed UTAUT depending on eight significant competing technology acceptance models. They proposed UTAUT as a unified model after comparing eight major technology acceptance models in their empirical study. The models are the theory of reasoned action (Fishbein & Ajzen, 1975), technology acceptance model (Davis, 1989), motivational model (Davis et al., 1992), theory of planned behaviour (Ajzen, 1991), combined theory of planned behaviour/technology acceptance model (Taylor & Todd, 1995), model of personal computer use (Thompson et al., 1991), innovation diffusion theory (Rogers, 1995), and social cognitive theory (Bandura, 1986). The UTAUT is considered the latest theory that describes user acceptance of technology (Mekhzoumi, Hamzah & Krishnasamy, 2018).

It is widely used to measure and predict the acceptance and use of educational technology research, especially mobile learning. The UTAUT contains four main constructs that affect the behavioural tendency to accept and use technology: performance expectancy, effort expectancy, social influence, and facilitating conditions. These constructs are moderated by four variables: gender, age, experience, and voluntariness of use (Venkatesh et al., 2003). Indeed, the UTAUT proposes the relationships between the four constructs and user's intention and usage behaviour of technology (Al-Adwan, Al-Adwan & Berger, 2018). In 2012, Venkatesh, Thong, and Xu (2012) created the UTAUT2 framework. They extended UTAUT by adding three constructs: hedonic motivation, price value, and habit. While hedonic motivation here refers to the fun derived from using technology, the price value is the monetary cost of technology (Venkatesh et al., 2012). In my opinion, both these

constructs are important in technology acceptance, especially in marketing. However, in the academic context, they would be less important than habit, which has a great impact on users' intention of using their own mobile phones in a blended mobile learning environment. The addition of habit would complement UTAUT's focus on intentionality as the key driver of behaviour, because it plays the main role in affecting behavioural intention and technology use (Venkatesh et al., 2012). For this study, I add three constructs: academic social influence, conditions facilitating academics as a replacement of social influence and facilitating conditions, and habit. This is because these constructs play a core role in determining the acceptance of blended mobile learning in higher education.

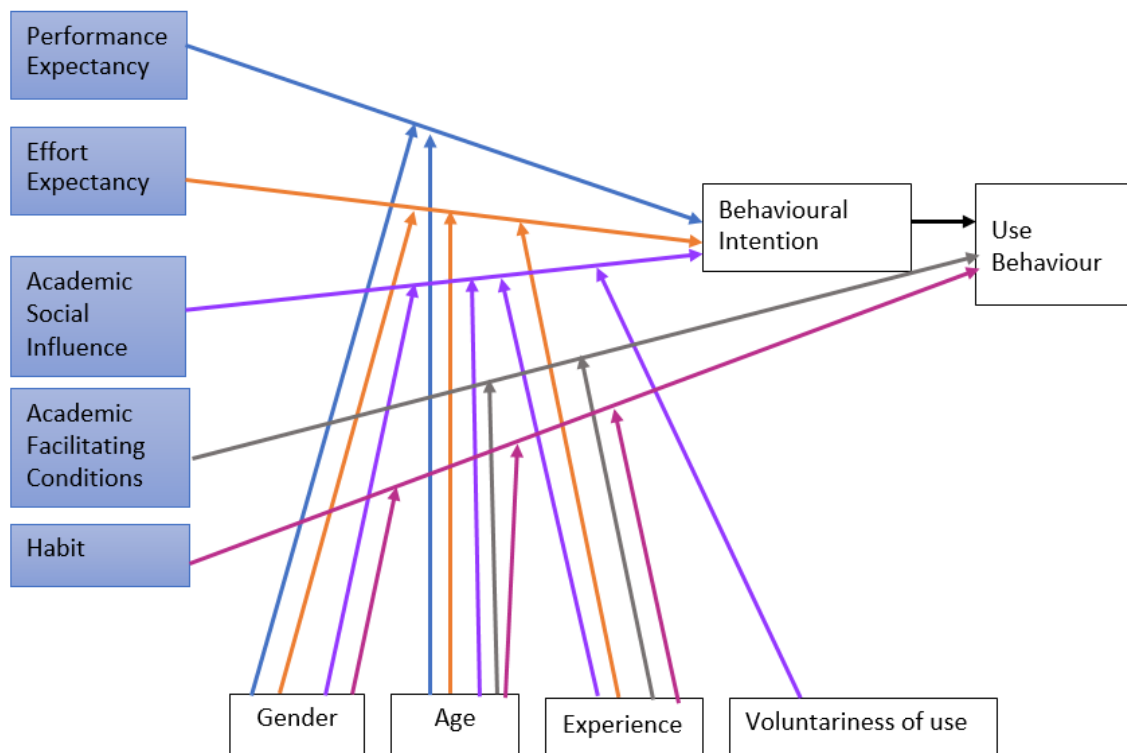


Figure 15 The used model is a modified acceptance framework that is based on UTAUT

The five main constructs that affect behavioural tendency to accept and use technology are listed below:

1. Performance expectancy: This describes the extent to which a user believes that using technology could enhance their job performance (Al-Adwan et al., 2018). Here, the individual believes that mobile learning will provide many advantages

related to supporting and helping them to complete their work (Akhtar & Khawaja, 2018).

2. **Effort expectancy:** This refers to the degree of simplicity and ease of use that an individual perceives when using a learning system or a given technology (Khechine & Augier, 2019). In this study, the term refers to the level of ease experienced when using blended mobile learning technology in higher education. Understanding the ease of using learning systems is considered a significant factor, particularly during its early stages of adoption (Al-Adwan et al., 2018). The easier the technology is to use, the higher are the chances of it being accepted.
3. **Social influence:** Here, the individual's decision to use technology is dependent on social interactions with the important people in their life, assuming they use certain technology. Social influence is another concept in the UTAUT model, which is defined as the perception harboured by an individual of other important people in their life who believe in the importance of blended mobile learning technology—for instance, the opinion of the teachers, students, classmates, friends, and family members about using a learning system (Khechine et al., 2019). Here, the users view social influence as a social benefit that results from the use of a new system or new technology. In the context of mobile learning, lecturers and peers have an important impact on students' behavioural intention to use mobile technology (Al-Adwan et al., 2018).
4. **Facilitating conditions:** This refers to technical and organisational facilitators that help users to overcome obstacles related to the use of a technology (Al-Adwan et al., 2018). Here, an individual believes that organisational and technical infrastructure is available to support the application of the technology or system so that anticipated challenges are overcome. Furthermore, it is also considered as the extent to which an individual believes that the available infrastructure in their organisation supports their use of mobile learning technology; this can include human, organisational, and technical support (Khechine et al., 2019). Al-Adwan et al. (2018) suggest that the absence of facilitating conditions could lead to a negative impact on technology usage and behavioural intentions. In fact, technical issues, such as limited processing speed, low bandwidth, unfriendly user interface, and reduced ability to surf, may prevent users from adopting mobile learning. In

particular, the functionality of personal mobile devices and support from learning providers appear to be vital factors.

5. Habits: This refers to the extent to which people tend to believe that behaviour is automatic (Limayem, Hirt & Cheung, 2007). The integration of habit is the most important theoretical addition to UTAUT2, which plays an important role in the behavioural intention that has a direct effect on technology use (Tamilmani, Rana & Dwivedi, 2018). Many studies conclude that users' habits have a great effect on the intention of using new technology (Abu Gharrah & Aljaafreh, 2021; Nikolopoulou, Gialamas & Lavidas, 2020; Venkatesh et al., 2012). This construct addresses whether the students' and lecturers' habits affect their intentions and acceptance concerning adopting mobile blended learning for education.

Summary

Although blended learning has become a trend in Saudi higher education (Anas, 2020), studies investigating students' perceptions of and experiences with this form of learning remain limited; yet, they are vital aspects that should be considered (Gulnaz et al., 2020). Some studies, however, have investigated the challenges associated with and perspectives on blended learning (Alebaikan et al., 2010; Aldosemani et al., 2019), effects on students' learning (Al-Qahtani et al., 2013; Alrouji, 2020), and student satisfaction (Alshehri, 2017). The shortage of computers in Saudi institutions is one of the challenges of blended learning (Aldosemani et al., 2019), which can be solved by incorporating mobile devices into blended learning (Mayisela, 2013). On the contrary, previous research on mobile learning conducted in the KSA focusses on the perceptions (Fayyoumi et al., 2013; Tayan, 2017), acceptance (Alasmari et al., 2019; Alharbi et al., 2017), and effects of mobile learning (Al-Emran et al., 2016; Al-Hunaiyyan et al., 2017). However, some studies show that most students used mobile learning informally, such as for self-study (Subhash et al., 2015; Alshammari, 2020). Consequently, this study aims to focus on the perception and acceptance of both students and lecturers towards blended mobile learning in formal education and the lack of mobile learning and formal education in the KSA.

Chapter Four: Research Design and Methodology

Introduction

Methodology refers to a systematic guideline used to solve a particular problem in any desired field. It is also a framework that applies to any specific research phenomenon. A methodology, therefore, encompasses various elements, including but not limited to phases, methods, tools, and techniques. Although there are several methodologies applicable to any field of research, according to Kothari (2005), the most appropriate method is the one that aids the researcher in obtaining a sense of meaning about the research phenomenon. This study aims to investigate the students' and lecturers' perceptions and acceptance of blended mobile learning at Qassim University in Saudi Arabia. Moreover, this chapter presents a concise report on how I carried out the proposed research. Moreover, this chapter presents a detailed description of the procedural steps followed to obtain the current study's data. In the following paragraphs, I outline the research design and method. Furthermore, the research questions, significance of the study, research design, pilot study, and strengths and limitations of the design are also explained. This section is then followed by segments outlining the data collection procedures, the target population, and the sample.

Research Paradigm: The Interpretive Paradigm

The researchers need to plan the research project by thinking of philosophical worldviews, research approach, research design, research procedures, and methods that translate the research approach into practice (Creswell, 2014). The following figure shows the framework for research presented by Creswell (2014).

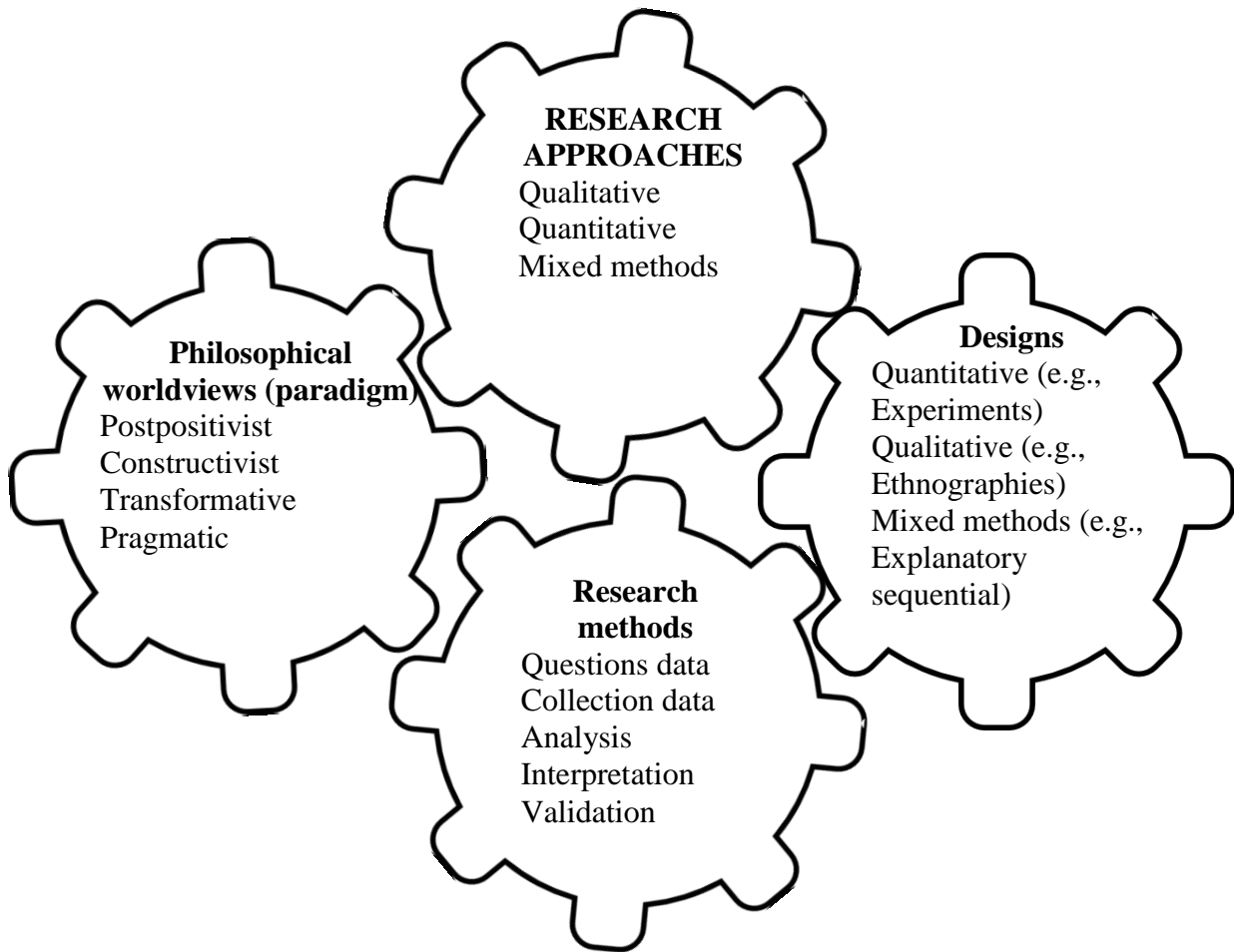


Figure 16 Interconnection of worldviews, design, and research methods (Creswell, 2014)

Kuhn, in his book *The Structure of Scientific Revolutions* (first published in 1962), first used the word 'paradigm' to mean a philosophical way of thinking that shapes researchers' beliefs of knowledge (Kivunja & Kuyini, 2017). According to Tracy (2019), researchers use paradigms related to ontology, epistemology, axiology, or methodology to build a knowledge base, understand reality, and gather data about the world. She adds epistemology is the nature of knowledge; ontology is the nature of reality; methodology is strategies for collecting and analysing data; and axiology is the values related to areas of research and theorising (Tracy, 2019). Paradigms describe a researcher's worldview, beliefs, and principles and explain how they see and interpret the world; thus, they determine the research's methodology and methods that are planned to be used for data collection and analysis (Kivunja et al., 2017). In fact, many definitions of the word paradigm define it as not just methods and techniques

that are used in a research work but also reflections and expressions of the researcher's thoughts and beliefs (Kerstetter, 2012). Moreover, many researchers have proposed a large number of paradigms. However, Candy (1989), who is one of the leaders in the field, proposes paradigms that are positivist, interpretivist, or critical (Kivunja et al., 2017). The following paragraphs will briefly explain these positivist and interpretivist paradigms:

1. Positivist paradigm

Positivism is a popular research paradigm that is used to test a theory or hypothesis (Taylor & Medina, 2011). Obtaining the knowledge in this paradigm occurs through observation and experimentation (Rahi, 2017). In addition, this knowledge is value free, absolute, and non-existent in a historic context (Scotland, 2012). This paradigm is also called empirical science, post positivism, scientific method, and quantitative research (Rahi, 2017). The paradigm mostly maintains ontology is realism and the absolute truth, regardless of human consciousness; epistemology is objectivism, as knowledge is created by understanding the interaction between the variables; and methodology is quantitative (Aliyu, Bello, Kasim & Martin, 2014).

2. Interpretivist paradigm

This paradigm is also known as qualitative research, constructivism, or social constructivism paradigm (Rahi, 2017). The interpretive paradigm appeared during the late 1970s in educational studies influenced by anthropology seeking to investigate and understand cultures from the inside (Taylor et al., 2011). Moreover, obtaining the knowledge in this paradigm occurs via the deep interpretation of a subject (Rahi, 2017). In addition, it allows the researcher to view the world through participants' perceptions and experiences (Thanh & Thanh, 2015).

The following table displays the characteristics of the interpretivist paradigm as applied in this study. It shows ontology, which is the nature of reality; epistemology, which is the nature of knowledge; and methodology—which are used in this study.

Feature	Description
Ontology	Relativism; there is no absolute truth but multiple realities vary according to human perception.
Epistemology	Reaching a position of knowledge involves exploring the participants' opinions.
Methodology	Hermeneutic and dialectical; An inductive study employs qualitative methods.
Axiology	Theory of value; the values are related to areas of research and theorisations.

Table 3 Characteristics of interpretivist paradigm

Research Approach: Qualitative Methods Research

Research approaches are procedures and plans made for research that include making several decisions related to research methods, designs, data collection, analysis, and interpretation (Creswell, 2014). In general, there are three major approaches to conducting a research study—quantitative, qualitative, and mixed methods—and selecting the right method is critical. In this study, the chosen method is the qualitative design approach. Most studies seeking data regarding individual experiences and perceptions used the interpretivist paradigm and qualitative methods (Thanh et al., 2015). The qualitative research process usually involves inducting from the data constructed by people as they interact with the world that they are interpreting (Creswell, 2017). One identifier of qualitative research is the social phenomenon investigated from the participant's viewpoint (Williams, 2007). Furthermore, qualitative research helps the researcher analyse and discover the meaning and value of human beliefs, feelings, behaviours, and intentions. It also contributes to the understanding of the human condition in different contexts and in relation to a perceived situation (Maxwell, 2008). It considers human realities and focusses on the subjective (Erlingsson & Brysiewicz, 2013). The qualitative design approach is, therefore, appropriate to determine students' and lecturers' perceptions, readiness, and extent of their acceptances in depth. Figure 17 shows the research framework. There are five qualitative research approaches: narrative, phenomenological, grounded theory-based, ethnographic, and case study-based approaches (Creswell, 2017). For this study, I have chosen an exploratory case study, as explained in the next paragraphs.

Qualitative Design: Exploratory Case Study

This research used an exploratory case study design. A case study is an in-depth study of a person, group of people, or phenomenon. The case study is an optimal research design that focusses on real-life phenomena and is used when 'how' and 'why' questions need to be answered (Baskarada, 2014; Yin, 2009). This type of research method design allows researchers to collect a large amount of information and data, which is an opportunity to collect information about new phenomena. It allows researchers to explore the main characteristics and implications of the case. Nevertheless, in this type of design, it is usually not possible to prove a cause or result. The results of the case study can be analytically generalised to many other cases, as its goal is to generalise to theories; however, it cannot be used to statistically generalise (Yin, 2009). Therefore, case studies can be exploratory, descriptive, or explanatory (Baskarada, 2014). An exploratory case study is used to explore situations in which the intervention that is evaluated is not clear, and there is no single set of outcomes (Yin, 2009). The case study for this research is Qassim University, and the data sources are interviews and open-ended surveys.

Gaps and Research Questions

The rapid development of science and technology has transformed the world into a digital era. This development has given rise to new tasks and responsibilities in education, forcing all educators and researchers to think of solutions that can keep pace with technological innovations and push the educational process towards technological development. The increased use of mobile technology in the Arab world has led to a massive change in every individual's everyday life. However, the use of mobile technology in the educational process is modest and fuzzy as compared to the phenomenal use of mobile technology. This research aims to bridge the gap between students' everyday life with their intensive use of mobile technology and the current traditional education system.

Qassim University's policies, similar to all Saudi universities, encourage the use of new technology for providing meaningful education. However, using mobile technology as a learning tool in a blended learning environment is relatively new and almost unfamiliar amongst lecturers and students at the university. At present,

students use mobile devices in their everyday lives but are restricted from its use inside the university premises for academics.

The two key research questions of this study are as follows:

1. What are the students' and lecturers' perceptions and understanding of using mobile learning in blended learning in Saudi Arabia?
2. What are the factors that affect students' and lecturers' acceptance of using mobile learning in blended learning in Saudi Arabia?

The subordinate questions are as follows:

1. What is the students' and lecturers' acceptance towards using mobile learning in blended learning?
2. How do students and lecturers use mobile technologies for education and learning?
3. What do students and lecturers know and understand about blended mobile learning?
4. How does using mobile learning affect higher education?
5. What are students' and lecturers' opinions and feelings towards using mobile learning in blended learning?
6. What challenges and barriers affect the implementation of using mobile learning in a blended learning environment?

Research Design and Data Collection Methods

This study seeks to answer the research questions by using qualitative methods. This is because it is necessary to get qualitative data to interpret the students' perspective, their acceptance, and the readiness of using mobile learning in blended learning. The qualitative method contributes to evidence-based practices because of its capability to research significant practical problems, interact with the participant while conducting the research, help the researcher understand and edit processes through the study, and explain both dependent and independent variables (Kozleski, 2017). Kozleski (2017) argues that qualitative research helps one recognise interactions between individuals in classrooms, which is cultural. Therefore, obtaining this data will help in in-depth exploration, enrichment, and characterisation of the phenomenon. A pilot

study was conducted before the main study to ensure all components of the study successfully work together. This research was conducted in Saudi Arabia at Qassim University. The dominant language found amongst all students is Arabic, so the study was held in the Arabic language and the results were translated to English.

The data collection instruments I used for the qualitative research include interviews, observations, questionnaires, and document analysis (Creswell, 2007). I utilised two research methods to collect data for this study: semi-structured interviews and open-ended questionnaire surveys. In a qualitative study, researchers usually use open-ended questions to encourage participants to express their views (Creswell, 2007). Therefore, this design was the most suitable for the study because of the need to collect in-depth data in order to answer the research questions by evaluating the perceptions and attitudes of students and lecturers regarding various aspects of blended mobile learning. In that regard, the effective way to collect data in semi-structured interviews was to meet participants inside the campus of Qassim University and schedule an appropriate time to set and answer semi-structured and pre-defined questions. I collected the open-ended survey data was collected by asking participants to answer structured and pre-defined questions. During the study, I had to modify or reconsider a decision in the design in response to new developments or to any changes that can happen in some other parts of the design (Maxwell, 2008).

1. Semi-structured interviews

To apply qualitative research, this study uses several strategies. The frequently used methods for conducting qualitative studies are interviews and/or observations (Leedy & Ormond, 2013). In this regard, one of the most common strategies used is an interview, which can detect facts, values, and realities. Interviews have many types, such as structured interviews, semi-structured interviews, unstructured interviews, informal interviews, and focus groups. The data collection in this research was specifically done using semi-structured interviews. They, also called in-depth interviewing, contain open-ended questions and are regarded as a scheduled activity that covers a list of topics (Bernard, 2017). The interview is a flexible tool for data collection, enabling participants to express their point of view, how they regard situations, and how they interpret the world. It allows the use of multisensory channels:

speech, hearing, verbal communication, and non-verbal cues (Cohen, Manion & Morrison, 2002).

According to Kvale (1996), an interview is an interaction between an interviewer and interviewee, conducted to elicit more insights pertaining to the study's phenomenon being analysed. In this research, I used open-ended questions to enable participants to freely share their views. The interviews provided information on, for example, the participants' attitudes and perceptions with regard to the study's phenomena. This data collection tool helped the present study by obtaining reliable deep information on the perceptions of students concerning the use of blended mobile learning at Qassim University. The interview was designed to contain 20 questions (Appendix 4). It was prepared to deepen exploration of the participants' perceptions, acceptance, and readiness towards blended mobile learning. I asked the participants about their mobile device ownership, the activities they engage in with their mobile devices, the time it takes them, their knowledge about blended mobile learning, and their habit of mobile learning. Moreover, their experiences with blended mobile learning, their feelings, and intentions to use mobile technology in a blended learning environment and their thoughts about blended mobile learning barriers.

2. Open-ended questionnaire survey

The second chosen method was an open-ended questionnaire. The open-ended questionnaire has advantages, such as the chance to discover the participants' spontaneously given responses and the possibility of avoiding the bias that may occur from suggesting answers to the participants (Reja, Manfreda, Hlebec & Vehovar, 2003). On the contrary, the open-ended questionnaire may have some disadvantages, such as unnecessary and repetitive information, and it may appear long. Participants would not be encouraged to complete it, because it takes time and effort to write down their responses (Cohen et al., 2002). It often begins with words such as 'how', 'why', and 'what', whose associated questions are usually answered with nothing definitive and with answers that are not anticipated by researchers (Gray, 2013). In fact, I decided to use open-ended questionnaires after collecting the data my interviews with female students. The results led to the need of discovering male students and higher education lecturers as well. Male and female lecturers participated in the open-ended questionnaire; a copy of these questions is in Appendix 8. While considering Saudi

culture and social traditions, data from male participants was collected using the open-ended questionnaire. The students' questionnaire was for both male and female students (Appendix 7). It was designed by following the steps and guides indicated in the book *Doing Research in the Real World* by Gray (2013). It was designed using Google Forms, and the link was shared with the participants.

I used a Likert scale in the survey, although it is usually a tool used in quantitative studies. It provided qualitative responses in this study (Chimi & Russell, 2009). In fact, I used it mostly to repeat some open-ended questions, because I harboured fears about the participants inadvertently dropping some important information. For example, there is a question using a Likert scale about social media apps; it enquired how much an individual uses it daily. Then, I listed 12 applications to ask participants whether they use these apps to communicate with others. I did so although I had previously asked them an open question about their experiences with and means of communication. The Likert scale ensures that the data is obtained from open-ended questions but not for collecting data concerned with numbers, frequencies of responses, and qualitative data. I have added numbers and percentage to the findings as summaries of the data. Maxwell (2010) states numbers provide more accuracy in view of statements about the frequency of a particular phenomenon, and thus, they complement qualitative information but do not replace it. He adds the numbers also contribute to the internal generalisation of responses in a qualitative study. He argues that the numbers provide justification for the researcher, as they ensure the researcher is unbiased by showing the inclusion of all diverse responses. In addition, the use of numbers is compatible with understanding the participants' views, and it makes a strong argument for a full understanding of the social phenomenon (Maxwell, 2010).

Translation of the Instrument

The participants of this study were students and lecturers living in the KSA and spoke Arabic. The questionnaires were in English and were examined and revised by the supervisor to make sure all the questions were clear, easy, and understandable. Because the entire target population consisted of Arabs and Arabic is their first language, the questionnaire was translated from English to Arabic by an English teacher with a bachelor's degree in English translation. Following this, two English professors at Qassim University reviewed the Arabic draft to confirm the accuracy of

the language. Finally, the questionnaires were tested in the pilot study and distributed to the sample students from Qassim University.

Validity

Rubin and Babbie (2016) define validity as the extent to which the instrument used in data collection can help in achieving the primary purpose of the research. For example, the use of correct and relevant questions in the questionnaires and interview enhances the reliability and validity of the study's findings (Trochim, 2006). After ensuring the relevant data is collected through the presented methods, the researcher will make sure an accurate generalisation is made of the research findings.

Trustworthiness, Credibility, and Transparency

Trustworthiness is defined as the process where the researcher can convince themselves as well as readers that their research findings are worthy of attention (Lincoln & Guba, 1985, as cited in Nowell, Norris, White & Moules, 2017). Nowell et al. (2017) list certain means of establishing trustworthiness in a qualitative study that uses thematic analysis. First, the researcher should prolong the process of familiarising themselves with data, triangulate different data collection methods, document theoretical thoughts, potential codes, and themes, and keep the data safe and efficiently organised. Second, the means of generating the initial codes could be researcher triangulation, peer debriefing, reflexive journaling, and utilisation of a coding framework. Third, they list other means to be theme searching, diagramming, and writing notes about hierarchies of concepts and themes. Fourth, they advise the researcher to check themes, sub-themes, and reference aptitude by returning to the raw data. Fifth, documenting the theme naming could be another step, according to them. Finally, a description of the detailed context, description of the review trail, and declaration of reasons for chosen theoretical, methodological, and analytical should also be included (Nowell et al., 2017).

While conducting this research, I spent a great deal of time data reading, rereading, transcribing, and translating. I also used two different methods for data collection. I documented all data and thoughts, and then, I stored it in two different devices. I used a coding framework and wrote down all notes. Moreover, I searched for themes, diagrammed them, named them, and documented them. Following this, I

checked themes by returning to the raw data. In conclusion, I have declared all theoretical frameworks, methods, and analytics of the data.

In spite of this fact, trustworthiness is refined by introducing criteria including credibility, transferability, dependability, and confirmability (Lincoln et al., 1985, as cited in Nowell et al., 2017). Noble and Smith (2015) indicate there is generally no accepted criteria and terminology utilised to assess qualitative research; however, there are some strategies that can ensure credibility. They list these strategies to ensure credibility in qualitative studies. The following are examples of these strategies:

1. Declaring any personal biases in sampling
2. Accurate record keeping
3. Looking for similarities and differences across data to ensure the representation of all different points of view
4. Collaborating with other researchers in order to reduce research bias
5. Validating respondents by inviting a participant to look at and comment on their interview transcript
6. Performing data triangulation by using different methods and perspectives to help produce more comprehensive findings

In this research, I used the respondent's validation strategy for which I invited a participant to read her interview transcript and then I asked her for comments. This strategy ensures research credibility. It is a process for credibility when a participant in a qualitative study rechecks and approves the researcher's interpretation of the data they provided (Carlson, 2010). In addition, I used a pilot study in order to ensure the collected data can answer the research questions. In fact, I have asked some lecturers to look at my data and comment during the translation and data analysis stages.

Transparency in research is defined as making the data, analysis, and methods visible so that others can evaluate them (Moravcsik, 2019). In this thesis, I have added a detailed description of all the data collection steps and the entire data analysis process. Indeed, I declared the sampling type, the process of choosing participants, and their representation from the population. Furthermore, I explained the ethical considerations, data collection procedures, and its expansion and development.

Moreover, the transcription process and verification procedures are also declared in this research.

Positionality Statement

In qualitative studies, the positionality is considered integral to the process; it shows the researcher's worldview and their adopted position towards the research (Holmes, 2020). In fact, positionality refers to the social, historical, and political background of the researcher that may have influenced their orientations (Malterud, 2001). Based on this, the researcher's positionality will be explained. As mentioned in page 30 of Chapter One, I am a university lecturer at Qassim University in the College of Education, Department of Educational Technologies. I am working at the female departments only, and all my students are female. I have around four years of experience in teaching. All of my students were undergraduates. As is the case with most students of Qassim University, the most prominent mother tongue found in the women's departments is Arabic. As an exception, there are a few international students who have scholarships at Qassim University, but they all speak Arabic. In fact, most classes depend on the Arabic language. However, there are departments that use the English language in some curricula, such as the English and medical departments. As a researcher, I introduced myself to those who participated as one of the faculty members at Qassim University. This research is based on my experience as a teacher at Qassim University and as a student in the US and UK. Finally, my study is funded by a scholarship granted by Qassim University in the KSA.

Pilot Study

Every successful piece of completed research has a pilot study (Lackey & Wingate, 1997). Oftentimes, the pilot study is a starting point for research. Eldridge, et al., (2016) define a pilot study as a study conducted before a comprehensive and major study has begun. A pilot study is a short version of the major study that is yet to be conducted to investigate if the components will work together, focussing on the main study's procedure (Eldridge et al., 2016). A pilot study has many purposes, such as defining the feasibility of conducting the main study, identifying the research problems, and developing the instruments of the planned study (Lackey et al., 1997). The pilot study could be designed specifically to test methods or ideas and explore their implications

(Maxwell, 2008). Therefore, in this research, a pilot study will be used for enhancing and developing the main research.

Before conducting this research, pilot studies were initiated with 63 students participating. The pilot study of this research project took place in the city of Buraydah, Saudi Arabia, in the month of September, 2017. It was undertaken with students from various departments of Qassim University. The responses from the open-ended surveys were collected across the target population and analysed to decide whether the data collected could answer the researcher questions and meet the objectives of the study.

The main aim of the pilot study on facilitating mobile learning in a blended learning environment was to first find out whether students owned mobile devices. Second, the study aims to test the designed questionnaire with regard to whether the data received can answer the research questions. Third, the study also aims to record students' opinions and perceptions about blended mobile learning at a preliminary level.

After the survey questions were translated into Arabic, the participants had to use the hard copy of a questionnaire on campuses. The participants were volunteers selected randomly from women's colleges, such as the College of Education and College of Sciences and Arts, of Qassim University. Furthermore, 63 students from different departments answered the questionnaire. They lived in various cities of Qassim, Riyadh, Al Madinah, and Hail. All the students were female and aged between 23 and 40 years. I met them personally to explain the study and retrieve their responses individually in F2F sessions. The reason for meeting these students personally was to encourage them to participate in the study; this enabled me to find out whether they had an internet connection, owned mobile devices, and could use them for education. The pilot study did not include male participants, because university rules do not allow female researchers to meet male students. Nonetheless, most of the students had the chance to participate in the pilot study. However, the graduate students were more interested than other students. Moreover, the sample in the pilot study was not a part of this main study.

The pilot study helped me test the questionnaire and ensure the students owned mobile devices that were connected to the internet, because this study implemented the BYOD strategy. The pilot study discovered that all participants had at least one mobile device connected to the internet. In addition, it confirmed students' positive attitude towards blended mobile learning. The study also revealed the participants' perception of factors that prevent the implementation of blended mobile learning. Surprisingly, the majority of the participants considered lecturers as the major reason for not implementing this type of learning. Therefore, I decided to include the lecturers to gain some perspective on their understanding, perceptions, and readiness towards integrating blended mobile learning at the university.

Strengths and Limitations of the Design

Although research concerning the use of mobile devices is increasing, most studies focus more on the use of mobile devices in students' everyday lives than on their use in a blended learning environment. There are, however, few studies that focus on using mobile learning in a blended environment. Mobile technologies are constantly expanding and increasing every year, and educators seek to develop the learning programmes they wish to provide in line with the requirements of the digital age.

Pimmer et al. (2016) observe that some scholars are contesting the transformational potential of using new digital technologies in higher education, particularly those that blend F2F teaching methods with e-learning teaching methods. Despite gathering more than 20 years of research on mobile learning, there is still little systematic information found, especially on adopting mobile learning in different educational designs and its effects on higher education (Pimmer et al., 2016).

Although this study was limited to male and female students and lecturers of Qassim University, the findings of the study apply to most Saudi universities. All participants were adults and had regular education without being challenged by disabilities.

Population

The target population in this study included students and lecturers of Qassim University, KSA, who have used mobile learning in their education. Although these

students use mobile devices in their everyday lives, they usually do not bring them inside most of the public schools and some universities. They were not allowed to use their mobile devices in lecture halls. Similarly, although lecturers also have experience using mobile devices in their everyday lives, they were not familiar with using mobile devices as a learning tool. Some lecturers allow students to use these devices inside lecture halls for academics. They are able to explain their knowledge, feelings, and beliefs regarding blended mobile learning to answer the research questions of this study.

Sampling

Sampling is a strategic process that employs statistical practices to encourage a target population to participate in the research. Kumar (2010) argues that sampling is useful in any investigation and exploration of certain situations, because it reveals new information about a particular field of research. On the same note, Polit and Beck (2006) suggest that sampling needs to be scrutinised to ensure that the study is valid. Typically, qualitative research requires only a small sample (Erlingsson et al., 2013). This research was an inductive study that used volunteer sampling. In this type of sampling, the selected participants are close at hand to the researcher (Rahi, 2017). This type of sample could be a useful indication of trends, although it needs to be treated with more caution (Grey, 2014). After obtaining all permissions to conduct the study at Qassim University, I made the announcements via posters and email to recruit participants. On meeting the volunteers, I gave them a full, detailed explanation of the study and scheduled the time for conducting the interviews. I also met some participants who agreed to participate in the open-ended survey but eventually opted out halfway, because they found the questionnaire too long. Overall, the sample of the semi-structured interview consisted of 12 female students, who were enrolled in different levels, courses, and departments at Qassim University. The sample of the questionnaire consisted of 72 students, of which 23 were male and 50 were female. In addition, of the 24 lecturers from various departments of Qassim University, 16 were female and 8 were male. All of them have basic experience in using technology, because they had taken three computer classes in secondary school. Moreover, there were no students in the sample with a disability that made it difficult for them to be involved in a programme that is not equipped for their special needs. Upon successful

completion, this study will be presented to all the departments, including the special education department, to ensure that the needs of the departments are addressed. Finally, since this study focusses on using mobile devices, all participants had access to a mobile device with an internet connection without any issues.

Participants Profile in Students' Interview

Table 4 shows the profile of the participated students in a semi-structured interview. To protect their privacy, participants were asked to choose a name for the study. Some of them used their first name, and others used a pseudonym.

Table 4 Participants in students' interview

No.	Name	Age	Current programme of study	Job	City	Annual income (SAR)
1	Ebtesam	27	Educational Technology	No job	Buraydah	--
2	Nora	27	Educational Administration	No job	Buraydah	12,000
3	Ruba	23	Maths Curriculum	No job	Magma'ah	12,000
4	Iman	34	Science Curriculum	Teacher	Buraydah	12,0000
5	Maha	26	Educational Administration	No job	Buraydah	--
6	Fawziah	37	Science Curriculum	Teacher	Hail	96,000
7	Rawa	24	Educational Psychology	No job	Buraydah	24,000
8	Mai	25	Science Curriculum	No job	Buraydah	--
9	Arwa	26	Educational Psychology	No job	Buraydah	--
10	Samar	26	Educational Technology	Teacher	Buraydah	80,000
11	Noha	28	Educational Administration	No job	Buraydah	--
12	Mona	29	Educational Psychology	Teacher	Buraydah	100,000

Age

Using mobile devices for education is beneficial and effective for students; however, there are many challenges associated with it, such as the controlling and monitoring they face when using their mobile devices. This is one of the most important challenges that concern educators, especially with regard to minors using their own mobile devices connected to the internet in places other than their schools. Improper use of mobile devices has been associated with students indulging in inappropriate or illegal behaviours, including cyber-bullying or cheating in exams (Mehdipour & Zerehkafi, 2013). However, since the students sampled in this study were adults, this challenge became more controllable. There are potential challenges associated with older people, such as the lack of digital skills and their deteriorating hearing or eyesight (Damodaran et al., 2017).

Although age is considered a very personal and subjective matter in the KSA and many people may even refuse to answer questions related to it, all the participants in this study responded without hesitation. All the students were adults aged between 23–37 years, with no special needs or medical issues preventing their use of mobile devices.

Gender

Like other Saudi universities, Qassim University too separates students by gender into different buildings and campuses. Moreover, female lecturers do not usually teach male students and are not permitted to meet or contact them. For these reasons, all the participants of the interview in this study were female. However, many of the university's male lecturers teach both female and male students, which means that the courses, curricula, teaching and learning methods, and assessments are similar. Furthermore, male and female lecturers sometimes share their course materials and exchange teaching methods.

Student Participants' Profile Based on the Open-Ended Survey

The participants were asked to provide their names or nicknames, age, city, current programme, job, annual income, and their qualification to better understand their characters and abilities (Appendix 1).

Age

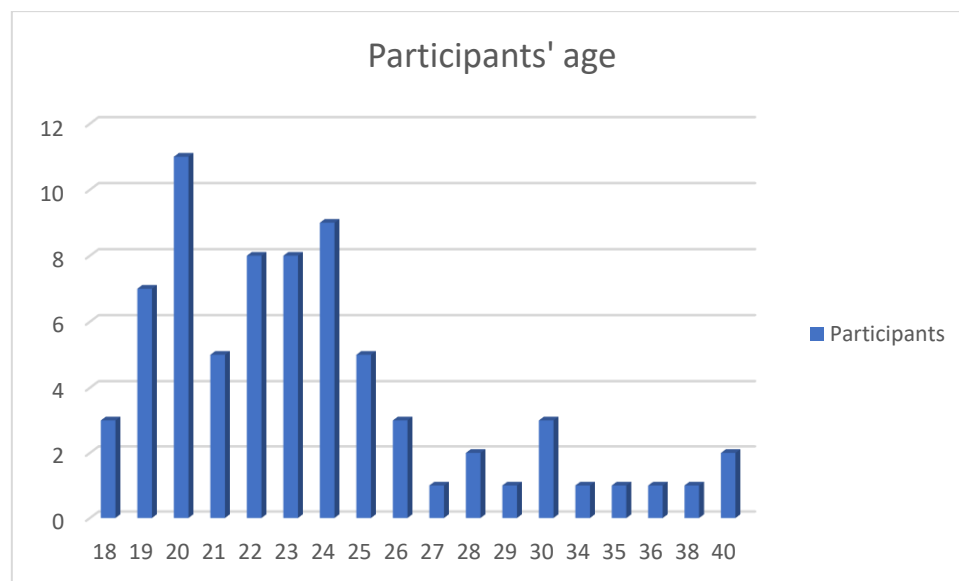


Figure 17 Age range of participants

All the participants were adults, aged between 18–40 years, and most of them were less than 27 years old. The older participants were pursuing their master's degrees and younger students their bachelor's degrees. Importantly, age played an important role in this study, because the study focusses on adult learning and teaching in HEIs. Nonetheless, all students in Saudi universities were 18 years or older. I used to teach at the university and have noticed that most of the students were in their 20s. However,

enrolling in a Saudi public university requires a recent high school certificate—that is, the students should not be older than five years.

Gender

One of the reasons for conducting an open-ended survey was to include male students. Although this study included both females and males, it was not easy to enrol male participants, thus making the data collection process longer. On the contrary, female participants were quick to respond and their numbers increased easily. The total number of participants in this survey was 72 (43 females and 29 males).

Current Level of Study

Another reason for conducting the open-ended survey was to include undergraduate students in addition to graduate students. The participants in this survey included five undergraduate students studying diploma, who are usually enrolled after high school and may take two or three years to complete their degrees. Furthermore, it included 43 undergraduate students, who may take four (education) to seven years (medicine) to complete. The study also included six post-bachelor’s diploma students, who are a part of graduate studies and may take a year to complete their degree. Lastly, the study included 18 graduate students.

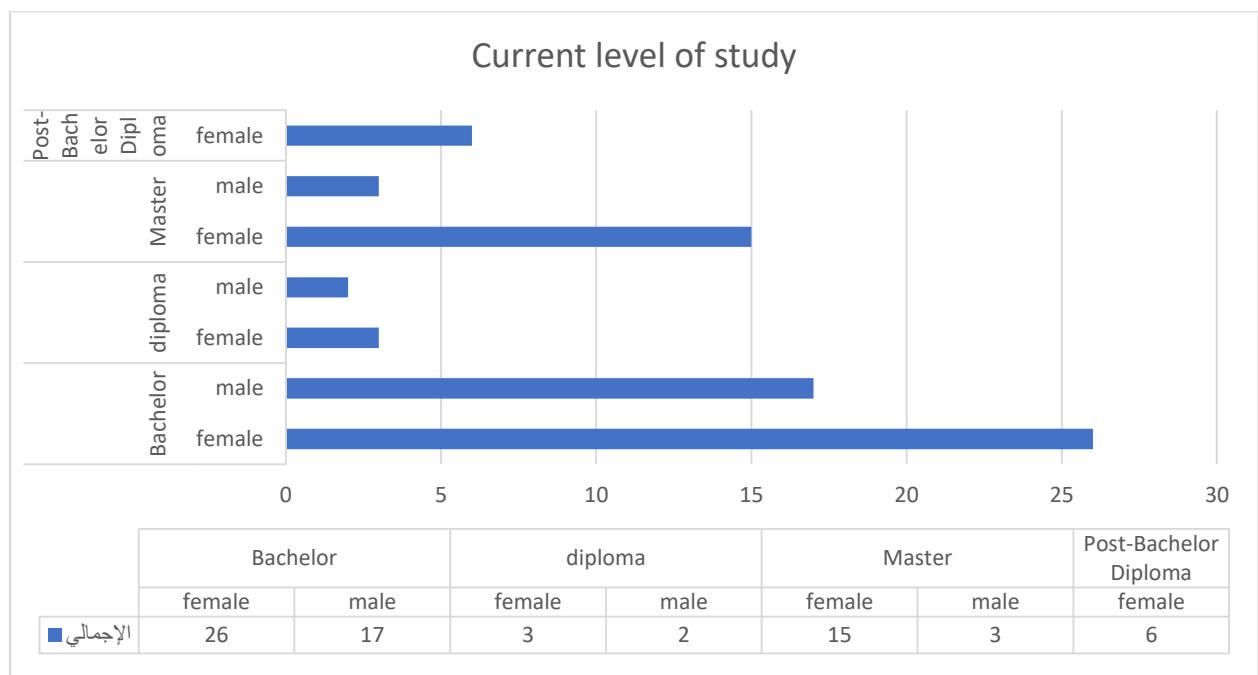


Figure 18 Participants’ current level of study

Lecturer Participants' Profile Based on the Open-Ended Survey

The participants were asked to provide their names or nicknames, age, city, current jobs, annual income, and qualification to better understand their characters and abilities.

	Lecturers' Name	Age	Gender	Job Name	Years of Experience
1	Salam	30	male	Lecturer	7–9 years
2	AAA	30	female	Lecturer	1–3 years
3	Albatol	30	female	Assistant Professor	1–3 years
4	Reem	30	female	Lecturer	1–3 years
5	Anhar	22	female	Teaching Assistant	1–3 years
6	Maysun	39	female	Assistant Professor	4–6 years
7	Mai	32	female	Teaching Assistant	7–9 years
8	H	30	female	Lecturer	1–3 years
9	Hifa	29	female	Teaching Assistant	1–3 years
10	Batool	29	female	Lecturer	7–9 years
11	Suliman	46	male	Lecturer	10–12 years
12	Fisal	27	male	Lecturer	4–6 years
13	Mohammad	47	male	Professor	more than 20 years
14	Huda	45	female	Associate Professor	13–15 years
15	N	43	female	Assistant Professor	7–9 years
16	Aishah	28	female	Teaching Assistant	4–6 years
17	A	40	female	Assistant Professor	7–9 years
18	Dua	42	female	Assistant Professor	more than 20 years
19	Sutam	35	male	Lecturer	4–6 years
20	Abdullah	50	male	Professor	13–15 years
21	Albara	40	male	Professor	4–6 years
22	Abu Mohhamad	53	male	Professor	more than 20 years
23	Amani	28	female	Teaching Assistant	4–6 years
24	Sahar	32	female	Assistant Professor	4–6 years

Table 5 Lecturer information

Age

The age of the participants ranged between 22 and 53 years, with the majority aged between 27 and 35 years. It is observed that the participants of an older age were mostly in higher positions.

Gender

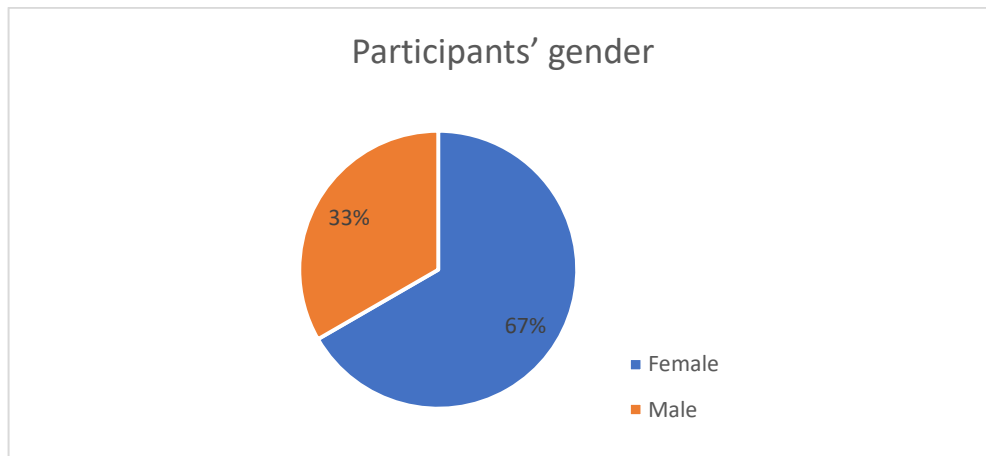


Figure 19 Proportion of female-to-male participants

This survey included 24 participants (16 female and 8 male). Female participants, however, were more responsive, faster, and more excited to complete the survey than their male counterparts. Many male lecturers ignored the survey due to the lack of time, while some promised to complete the survey but did not. Interestingly, in 2015, the Saudi General Authority for Statistics reported that the number of male lecturers at Qassim University was 2,339 as compared to the 1,551 females.

Data Collection Procedures

This study seeks to undertake an in-depth exploration of students' perception of blended mobile learning in higher education. In this study, the participants were encouraged to express their opinions, feelings, and suggestions to answer the research questions. The study used a qualitative approach. I travelled back to the KSA, specifically to the city of Buraydah, to visit the women's colleges at Qassim University. On meeting the students, I shared with them my personal information and provided a detailed explanation of the study by sharing with them some papers that contained the study's details. I expected a lot of interaction with the selected sample, but I faced a lot of resistance and saw reluctance on their side to participate. First, the interviews were conducted with 12 female students, and each interview was scheduled

in advance. Interviews were held in one of the empty lecture halls of the university. Each interview lasted between 10 and 20 minutes. Some of the students responded smoothly and spontaneously, while some of them took more time to think and asked for more clarifications regarding the questions. All of them consented to being recorded during the interview with my mobile app. However, after the interview, one of the students requested that I delete the recording. However, I told her deleting the recording meant that she did not participate in the study. She changed her mind and agreed not to participate. I immediately deleted the recording and cancelled her participation in the study. Another student attended the interview with her daughter, who she picked up from the nursery located inside the university before the interview. After collecting the data from the interviews, they were written down and translated from Arabic to English.

There was an option to conduct interviews telephonically. Unlike the female participants, the male participants showed reluctance in consenting to being recorded by phone. After consulting with my academic supervisor, I decided to use the open-ended questionnaire. The questionnaire became a means to reach a larger sample of female and male participants. It was filled by 72 students, who stated that the questionnaire took them approximately 20–40 minutes to complete. Comparatively, female participants were faster and more responsive than males, many of whom promised to complete the questionnaire but never did.

After collecting, reading, translating, and analysing data from the questionnaires, the findings suggest that based on the students' perspective, lecturers are strong and effective forces that prevent the use of blended mobile learning in higher education. Therefore, lecturers (24 male and female) from different departments and colleges of Qassim University were also included in this study; this enabled me to find out their opinions concerning this form of learning. They filled out questionnaires showing their opinion, perceptions, acceptance, and readiness to use blended mobile learning in their teaching.

Ethical Considerations

Social research that focusses on people's relationships with the world may affect the rights and sensibilities of other people; therefore, it needs to be particularly sensitive about issues related to ethical behaviour (Walliman, 2017). According to Oliver (2010), a researcher must maintain a high code of ethics when conducting an investigation. This guarantees that the researcher obtains accurate and valid information from all participants. In this research, the feedback received from individual students and lecturers was an important area of concern for both the participants and the institution, and therefore, I collected feedback with utmost sensitivity and confidentiality for my use and kept the names and private information of the participants confidential from third parties. Further, I also ensured the anonymity of the participants during the administration, collection, and interpretation of questionnaire responses; this is also true of the data collection process from the semi-structured interviews. In this regard, I have discussed the ethical issues for this study with my supervisor and received approval from the University Research Ethics Committee at Brunel University. Furthermore, I provided all participants with a form explaining their rights and the purpose of the study and obtained their informed consent before commencing with the interview and the questionnaires. I then briefed them on the purpose of the study and their right to free participation before data collection. I also informed them of their rights to withdraw from the study at any time. They were informed that the participation was voluntary. My contact information was shared with the participants. Finally, I also informed them that no personal information would be published and that their information and responses would be used solely to complete this study privately and anonymously.

Data Analysis

There are different methods and techniques for analysing, explaining, understanding, and interpreting qualitative data: grounded theory analysis, content analysis, narrative analysis, discourse analysis, framework analysis, and thematic analysis. This research used thematic analysis to distinguish themes within the obtained data, although the volume of the collected data was high. However, the data classified into themes and codes led the researcher to complete an in-depth exploration. Thematic

analysis is one of the most popular methods used in the analysis of qualitative data, in which the researcher organises and allocates data into specific topics, categories, or pre-determined themes and interprets them analytically to find answers to the research questions. It is one of the most popular approaches developed by Braun and Clarke (2012). They define thematic analysis as a method that identifies, organises, describes, analyses, and reports in detail patterns of meaning (themes) within the research data. It is usually considered a foundational method for qualitative analysis (Braun et al., 2012). This analysis may be conducted by focussing on the commonalities between the data, but the common or recurrent theme may not necessarily be significant or meaningful in itself. These processes were used to interpret the data collected from the students and lecturers to form a valid conclusion from participants' perceptions on the effectiveness of integrating blended mobile learning at Qassim University.

To classify data into themes, I transcribed the interviews from the audio recordings of 12 participants and then translated them. I also translated the data obtained from 72 open-ended surveys to draw themes from data by following Braun and Clarke's (2006) six-step procedure for thematic analysis.

First, after conducting all the interviews, I listened to the audio recordings and repeatedly reviewed the transcripts in Arabic. The purpose of this step was to ensure I was familiar with the data and to look at any obvious implications and start identifying preliminary codes. At this step, I made detailed notes to facilitate coding and complete the steps in the thematic analysis.

Second, I generated the initial codes from the data. After organising the data, I manually assigned the initial codes by examining all data sets to underline important words. Informative code names were then allocated to each underlined portion of the text. This phase involved identifying the features of the data. I used open coding by developing and modifying the codes while working through the coding process rather than having pre-set codes.

Third, I then collected codes under potential themes and sub-themes. The term 'theme' refers to a pattern that responds to research questions and captures something interesting or significant about the data (Maguire & Delahunt, 2017). At this

phase, I organised the codes into broader themes that potentially captured something significant about the research question. I used Microsoft Word documents and Excel sheets to manage the data related to the themes.

The fourth step was reviewing the themes. I conducted a deeper review of identified themes by examining initial themes on whether they must be combined, refined, separated, or discarded, which is usually a two-phase process: checking themes in relation to the coded extracts, which was followed by checking for the overall data set. Therefore, I examined the coded extracts from the data and carefully reviewed all the sets of organised data to confirm the data were in harmony with the themes. I then reviewed the entire dataset. Finally, I generated a thematic map at the end of this step.

The fifth step was to name and define themes and potential sub-themes within the data as well as describe what each theme referred to and what was interesting about them; this was done to generate a comprehensive analysis of the understanding of the data that the themes and sub-themes contributed to.

The final step was to write and produce the report of the qualitative data analysis. The report aims to provide a detailed analysis of the study's findings. This was a significant step where I decided on the themes that represented more meaningful contributions to understanding the data.

Update from 2021

On meeting some of the female students to ask them about their interest to participate in the questionnaire, I asked them for their mobile number for communication via WhatsApp, in case additional information was required later. A few of them had no issues sharing this personal detail. At the time, I could not think of any additional information other than their contact numbers. Later, some of them contacted me seeking information about the Qassim University system or advice concerning studies abroad. Then, in January 2021, after the coronavirus disease 2019 (COVID-19) pandemic had begun, I contacted them again to see if there were any changes to their response or if there was anything new to add; of these attempts to contact them, one was a wrong number, two did not answer, five said they were busy and had no time, and nine said they would read their answers and reply. Through WhatsApp messages,

the participants briefly described their current classes and commented whether there were any significant changes between then and now.

Chapter Five: Data from the Students' Semi-Structured Interviews

Overview

This and the following two chapters address the findings, analysis, and discussion of the data collected from the interviews and the open-ended survey. This qualitative data is interpreted in an attempt to investigate the acceptance and perceptions of blended mobile learning in Saudi Arabia. The results are divided into three chapters: Chapter Five, which addresses data from the students' semi-structured interviews; Chapter Six, which addresses data from the students' open-ended surveys; and Chapter Seven, which addresses data from the lecturers' open-ended surveys. In order to answer the research questions, each part has participants' understandings of the three main terms of the study, factors that affect their acceptance, and challenges and barriers that implementing blended mobile learning faced.

Chapter Introduction

The interviews were conducted in October, November, and September of 2017. The participants were 12 graduate students from the Education College for Girls at Qassim University. At that time, the Qassim University policies, as is the case in most universities in Saudi Arabia, prevented female students from entering the college with mobile devices. However, the graduate students at the Education College were permitted to do so and, therefore, were selected as the target sample for interviews in this study. After a short while, the Saudi Ministry of Education responded to the female students' demand and allowed all mobile devices inside the universities. Female university students from various cities in Saudi Arabia made many claims in 2017 via Twitter with regard to the universities' security staff and prohibition of smartphone usage. Twitter is considered a bridge between students and the Minister of Education, especially with the students' use of hashtags and their ability to quickly make one a trend.

After repeated complaints from female students about the prohibition of smartphones on campus, the Saudi Ministry of Education understood the importance of allowing them to use smart devices; they were convinced the devices instil confidence in female students while also enabling them to use modern technology in

ways that do not oppose laws or regulations. The ministry ordered all university authorities to permit students to use their smartphones. Despite this, the Saudi Ministry of Education still prohibits the use of mobile devices inside classrooms in public schools, especially when the activities in question are related to photography. The decision to permit the use of smart mobile devices was limited to higher education institutes (HEIs). The sections below contain information on the students' jobs and income along with how they perceive blended mobile learning. They explain in detail what the students understand about terms such as mobile learning, blended learning, and blended mobile learning. Moreover, they show their level of acceptance and outline their opinions about the barriers they face when adopting this type of learning.

1- Students' Jobs and Financial Income

Although the use of new technologies is encouraged in the Saudi education system, the Ministry of Education and university administration have not announced any plans to supply the university with mobile devices. Thus, this research focusses on students using their own devices: 'bring your own device' (BYOD). This means that the students bring their own devices to facilitate learning within their institution (Hynes & Younie, 2017). For this reason, it is first necessary to investigate the students' ability to acquire a mobile device.

Four of the 12 students sampled—Fawziah, Iman, Samar, and Mona (see Table 4, p. 112)—already work as teachers in public sector schools. They were being paid during a withdrawal period from their jobs, which would extend to two or three years to cover the period of their master's education. Their average annual income was 99,000 SAR (approximately equal to 20,550 GBP). The remaining nine students were unemployed, so the Ministry of Education paid them a monthly stipend of 900 SAR when they were enrolled as students. Students who are not working government jobs receive this monthly sum from the government so they can be supported during their studies. In addition, some of the students mentioned that they received financial support from their families. For example, Rawa, who was unemployed, stated,

Although I do not officially have a job, I sometimes help my sister with her project. She works at home as a pastry cook, which is called 'Productive Families'. The term 'productive families' refers to people

creating things and selling them from their homes with the aid of mobile technology and the prospect of participating in public events. My sister published some pictures of sweets she had made, with the product details, via Instagram. She can communicate with customers through WhatsApp. She also sometimes supplies some dessert shops with her products, on request. In fact, my sister benefits a great deal from mobile technology. Sometimes, when I am free, I help in her kitchen and prepare the orders. This gives me a very good extra financial income. Hmm... let me calculate... I earn around 24,000 SAR annually.

It is typical for Saudi families to supply their children with money for their daily requirements and educational equipment, depending on their ability to do so. This support generally continues until they find a job. However, if the family does not have sufficient means, the financial assistance comes from the government and donations.

All twelve students appeared financially stable; four of them were already employed; the others received support from their families; and the rest received the 900 SAR stipend from the Ministry of Education. This enabled them to purchase sophisticated smartphones that are essential for blended learning. Those not in government jobs are basically supported by the government, their families, and donations.

This data generally implies that Saudi Arabia is a state that strives to respond to the evolution of technology in education. It has been a few years since the establishment of the first higher education institution, and now, there are more public universities and some private institutions all over the country (Abdelaziz, 2020). The fact that the government pays the students in order to support blended mobile learning is enough to show its efforts in implementing it. According to Sarrab, Al Shibli, and Badursha (2016), Islamic culture is still vital in all perspectives of life, including learning, as evidenced by the fact that financially supporting their adult children is normal for Muslim families. The trend in higher learning is moving towards integrating physical learning with mobile learning.

2- Students' Understanding of the Terms

One of the aims of this research is to explore students' understanding of the terms 'mobile learning', 'blended learning', and 'blended mobile learning'. Each student gave these terms due consideration before responding with their thoughts. Moreover, most of them asked if their understanding was right. They were excited to know more about blended mobile learning. In the following paragraphs, their answers and thoughts about the meaning of these terms are presented.

Students' Understanding of the Term 'Mobile Learning'

One participant stated that she did not know what the term 'mobile learning' meant; she had never even heard of it. Most of the participants understood it to mean the event when a student uses mobile devices for learning. Moreover, one of the students seemed to be more familiar with the concept than her peers, stating that it meant learning while being mobile ('on the move').

Ten of the students described mobile learning as 'learning by using mobile devices', 'learning through smart devices', or 'using mobile phones and tablets for learning'. Moreover, they made these statements: 'As I know, mobile learning means using mobile devices to transfer and gain knowledge'; 'I think mobile learning is learning something through the use of mobile phones'; 'This term means using mobile devices in education'; 'Learning using mobile technologies'; and 'Mobile learning is using mobiles to learn something.' Moreover, the students who had some understanding of the term stated, 'Mobile learning, as I understand it, is using mobile phones for educational purposes,' and 'It means learning that can take place with the aid of mobile devices.'

Conversely, Samar seemed to have more knowledge of the concept, stating, 'Mobile learning is learning while mobile, using mobile devices. This learning method depends on new technologies, apps, and networks, unlike traditional learning methods, which depend on blackboards, books, and teachers in a traditional classroom.'

In fact, most of the participating students' understanding of mobile learning reflects their knowledge of modern education and technology. Most of them related mobile learning to mobile devices even though the two concepts use different words

in the Arabic language. For example, mobile devices in Arabic are usually called smart devices, and the word for mobile learning in Arabic roughly translates to the 'moving of learning'.

It is difficult to guess the relationship between mobile learning and mobile devices without previous knowledge. This data helps to evaluate if the students understand the meaning of blended mobile learning. Although their definitions of mobile learning differ, they arrive at the same conclusion in defining this kind of learning.

Students' Understanding of the Term 'Blended Learning'

Unlike the term 'mobile learning', 'blended learning' was less known to the study participants. It appeared that some of the students misinterpreted blended learning as the mainstreaming of special needs students in schools with peers who have no special needs. This is because the two terms are very similar in Arabic. Moreover, five of the 12 students claimed that they had never heard it before and could not guess what it meant. Meanwhile, two of the students declared that blended learning was a new concept or term for them, and three thought it meant using new technology in the classroom. They made the following statements: 'Blended learning means using new technologies in classrooms'; 'It means using new devices and technologies like computers in schools'; and 'Blended learning, as I understand it, means using traditional methods in education and certain some technologies.'

Four of the students thought blended learning meant using the internet in conjunction with traditional learning, stating the following: 'Blended learning is using the internet in classrooms'; 'Maybe blended learning is using traditional learning methods with the internet for learning'; 'Blended learning means learning in traditional ways with some of the new technology and online learning'; and 'I think, in blended learning, there are teachers and new technology devices, because it is a mix between technology, the internet, and traditional learning.'

Thus, the participants tried to describe what they knew and thought of blended learning. None were confident when answering this question, despite the fact that some of them were close to knowing the meaning of the term.

From the students' understanding and definitions of blended mobile learning, it is evident that the use of the term 'e-learning' has affected the students' expectations of distance learning in Saudi Arabia. Most higher education institutions in Saudi Arabia offer studies using a distance learning model that offers instructions basically via the internet; this is also known as e-learning (Al Masarweh, 2019). Incorporating the word 'e-learning' instead of 'blended learning' has caused the students a lot of confusion and dissatisfaction with its implementation (Alhassan, 2016). This explains why many students do not understand the term 'blended learning'; they are confusing it with e-learning. Those claiming to understand the meaning of the term give a different definition and view of the same. The student's perception of blended learning helps us evaluate the complexity of the topic and how the students perceive it.

Students' Understanding of the Term 'Blended Mobile Learning'

Not only did a few of the participants have any understanding of the meaning of blended learning, but they also had little knowledge of blended mobile learning. Some mentioned the use of mobile devices in education. For instance, they made the following statements: 'Blended mobile learning is using mobile phones and tablets in classrooms,' and 'Blended mobile learning is using mobile devices in education as well as using hard materials, such as books.' Some of the students also mentioned combining traditional educational methods with mobile learning: 'Blended mobile learning is using both traditional education methods with learning through the use of mobile devices,' and 'I guess blended mobile learning means learning via mobile technology along with traditional ways.' They also stated, 'Mobile blended learning is adding mobile devices to blended learning, so there will be mobile technology and traditional learning as well,' and 'Mobile blended learning is a mix of traditional education methods and mobile learning.'

Therefore, some students had an idea what blended mobile learning referred to even though it was a new term for them. They explained their definitions by using their knowledge of both terms.

The students clearly did not have a common definition of blended mobile learning. The majority understood it as the opposite of what the others understood. For instance, some believed that it involved using mobile devices in classrooms, while the others

insisted that the mobile devices must be adopted alongside the traditional ways of learning for there to be blended mobile learning (Alasmari et al., 2019). Blended learning integrates mobile devices, technology, traditional learning, face-to-face (F2F) learning, and mobility. This is critical when evaluating how students understand the term 'blended mobile learning'. From the results of the interviews, we can tell that some of the students understood the meaning of blended mobile learning, as they could apply their knowledge of the terms 'mobile learning' and 'blended learning' to derive the meaning of blended mobile learning. The students' knowledge on this particular topic is similar to the previous studies, as learners in previous research clearly knew the term by combining their knowledge of the terms 'mobile learning' and 'blended learning'.

In summary, there are various terms that are hard to avoid and are used often in the field—that is, mobile learning, blended learning, and blended mobile learning. The terms are correlated and commonly exist together, although they have different meanings. Mobile learning is the incorporation of mobile devices in higher education learning. However, some scholars may argue that it is the act of learning while in motion. The basic meaning of blended learning focusses on the role of physical instruction. Blended learning involves using traditional ways of teaching, F2F learning, and technology in studies. Finally, blended mobile education seems to derive its meaning from both blended and mobile studying. Blended mobile education is the integration of both mobile and blended studies. Blended education integrates mobile devices, technology, traditional and physical education, and mobility. The students' experiences demonstrated that their understanding of the terms mobile learning, blended learning, and mobile blended learning would enable them to comprehend their educational environment.

3- Confidence in Using Mobile Devices for Learning

One of the important conditions for adopting blended mobile learning is having sufficient confidence to use mobile devices for this purpose. For that, the participating students were asked about their confidence levels. The results indicate that all 12 students were confident using mobile devices for education. This included apps both previously used and not. They claimed that mobile devices were designed to be easy to use, and so, learning how to use them did not take long. Mona stated, 'Because of

mobile devices' ease of use, we can see old people use them a lot and like to depend on certain apps to facilitate their lives.' Iman agreed with this, adding, 'The smart mobile phones' ease of use make mobile devices popular and sought out by most people.'

Although mobile devices are vital elements in blended mobile learning, having a high level of confidence in using smartphones is crucial to blended mobile education at large. The popularity of smart mobiles and their ease of use make it an important tool for studying in this education model. Nearly all are able to use new technologies without any difficulties. Moreover, students find it easy to navigate through applications that facilitate learning in higher education institutions in Saudi Arabia. The applications are easy to navigate because of how they are designed and because of the students' confidence in incorporating these devices in their learning. The fact that all the students expressed a high level of confidence in using the smartphones for education shows the place of new technology in Saudi Arabia's higher education.

Based on these responses, we can confidently assert that a conducive blended mobile education environment can result in high levels of confidence when using mobile devices in higher education. According to Turki and Sathiyarayanan (2018), instructors and institutions facilitate a conducive learning environment to cultivate the student's confidence in using mobile technology that they find easy to use. The more the students are introduced to blended mobile learning, the more comfortable they are incorporating technology into their studies. In other words, the learners end up having a high level of confidence in carrying smart devices for their studies (Alhassan, 2016).

4- Student Acceptance

This section looks at students' acceptance blended mobile learning through the use of the unified theory of acceptance and use of technology (UTAUT) model. Furthermore, it explores the factors that influence their acceptance. The participating students were asked specific questions that related to each of the factors of the UTAUT model.

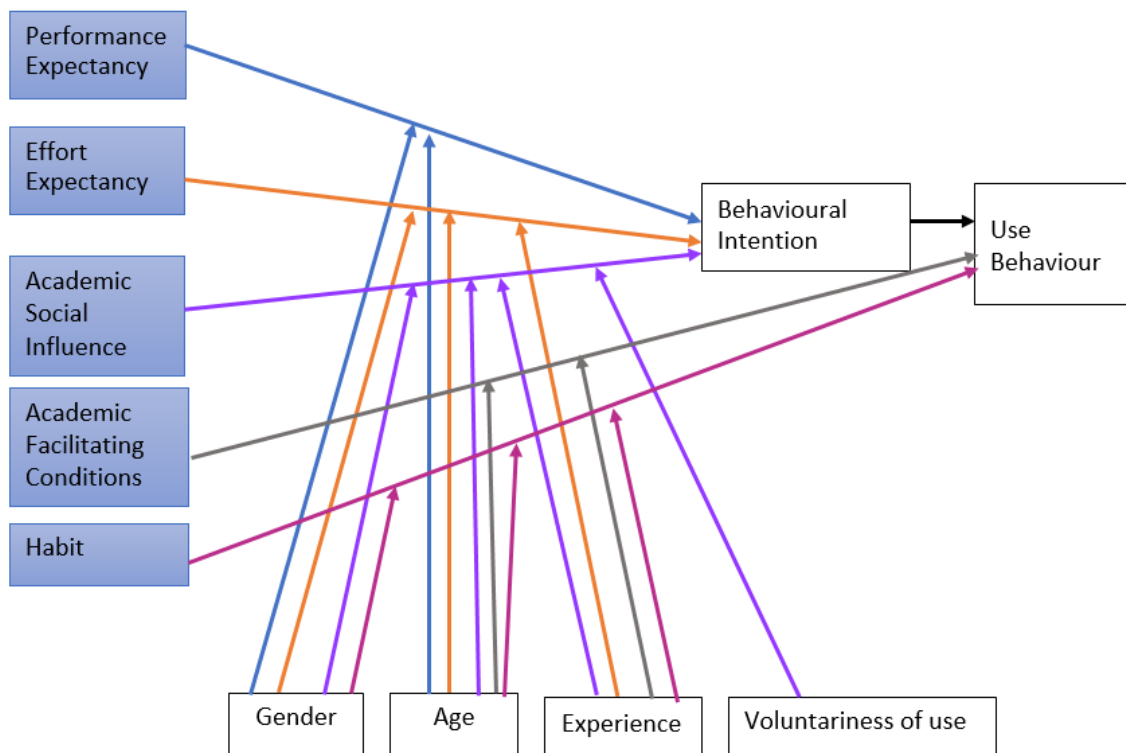


Figure 20 A modified acceptance framework based on UTAUT

Facilitating Conditions

The first factor to consider is the facilitating conditions. This information is ascertained by verifying whether students own mobile devices, can access the internet easily, spend sufficient time using mobile devices, possess necessary skills, and use appropriate mobile apps. It demonstrates the various challenges experienced by learners in blended mobile learning in Saudi Arabia.

Internet Access

All of the students had access to the internet most of the time, especially within the university campus. They confirmed that the university allowed them to connect to its network, and each student received a password. Samar stated that when she was an undergraduate student, the internet was not available for students, even in computer labs. She added that they had always worked offline on desktop computers and transferred their work to USB drives when they finished. Mona made the same point: the availability of an internet connection enabled students to access their work more easily. She stated that using CDs to share work in group tasks was difficult and data was vulnerable to loss.

Ebtesam added, even just a few years ago, it was complicated to exchange course materials and they were difficult to obtain. Thankfully, the internet made studying, communication, and general living much easier. As graduate students, they had access to the university Wi-Fi. Most of them also had their own internet connection, and some had unlimited data that they shared with their friends. Moreover, all the participants stated they could now download any necessary apps and materials and access any content provided, making their studying significantly easier.

In fact, public internet networks are not very popular in Saudi Arabia. Instead, it is common to ask a friend, neighbour, or even the host in one's house for their Wi-Fi password if they have internet plans with unlimited data.

Students' Ownership of Mobile Devices

As described above, this research depends on students using their own mobile devices, and so, it was necessary to ensure that they did indeed have such devices. Because of this, all the participants were asked if they had a mobile device and, if so, its type.

All 12 students declared that they had a mobile device, with two of the participants owning two each. The students also added that their peers all had mobile devices. For example, Mai claimed that she even knew children of late that had mobile devices and emphasised, 'I do not know any college student that does not have one.' Most of the mobile devices were Apple products, with two of the students possessing the iPhone 6; two owning an iPhone 6+; two owning an iPhone 7; one owning an iPhone 8, and three with the iPhone X. In contrast, one student had a Samsung Galaxy S8 and one had a Samsung J7. Iman explained that owning the latest model of a mobile device gave a person a modern and fashionable image. Mona expressed this same idea: 'I have iPhone 6+ now, but I will buy iPhone X soon.' She stated that she would sell her current device to get a newer and more modern one, because she felt that owning a device with the best features and latest additions would improve her image and keep her looking fashionable.

Aside from the above, two of the students owned iPads in addition to their iPhones. Samar explained that she used her iPad for reading, writing, and editing photos, because it was easier when working on a large screen. Ruba made similar

comments, stating that she used her iPad to read e-books, websites, and blogs. However, she added that the size of the iPad sometimes made it hard to carry around. Despite this, the large screen and long battery life made it worthwhile, even if it meant carrying a bigger bag.

This question highlights the students' ownership of mobile devices and their interest in being fashionable by owning the latest versions and models. In short, the results above show that the facilitating condition is available for the students.

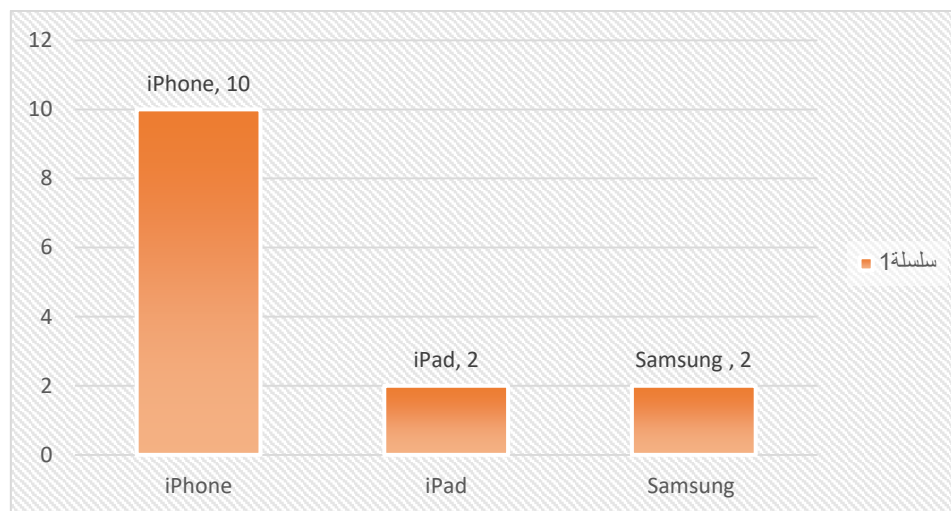


Figure 21 Type of mobile devices owned by the students

It is clear that all the students own mobile devices and this helps them to engage in blended mobile learning. The fact that some students even own two latest mobile devices shows how they are embracing blended mobile learning and that they are well equipped. Moreover, some specifically own iPads to facilitate learning and access to learning materials. However, the challenges in carrying some of the learning mobile devices, such as iPads, hinder the students while pursuing blended mobile learning (Davie & Hilber, 2017).

This part of the paper discusses whether the learners own mobile devices and are able to access learning materials through them. The previous studies on students' ownership of mobile devices were similar to this and showed that most of the students in Saudi Arabia owned mobile devices despite the varying cultures that viewed them and internet accessibility as being against their norms and values (Alowayr et al., 2016). Moreover, the argument was that almost all the students not only owned more

than one mobile device but were knowledgeable in using mobile apps to access learning materials and send them to their peers.

Although there are various facilitating conditions for blended mobile learning in Saudi Arabian higher education, there are some issues, such as internet accessibility and ownership of mobile devices, that are outstanding. We have seen internet accessibility problems occur on and off campus. According to some students, even computer labs did not have access to the internet. The lack of access itself presented a great challenge to the students, since they could not access—or faced difficulties accessing—learning materials from the internet and, as a result, could not send them to their peers.

However, with the evolution of technology in HEIs in Saudi Arabia, it has become easy for students to access the internet on and off campus. All of the students own mobile devices of varying sizes, models, and sophistication. Some even own iPads to facilitate learning, as they have large screens suitable for reading. This has enabled the smooth facilitation of blended mobile learning in Saudi Arabia.

Performance Expectations

Another key consideration is the performance expectations. The students were asked about their expected outcomes of blended mobile learning, academic achievement, and motivation for learning.

Effects of Blended Mobile Learning on the Learning Process

The participants mentioned some of the positive effects of implementing blended mobile learning. Some claimed it could make learning and education more enjoyable, clearer, faster, and more interactive. They also suggested that it could increase the effectiveness of education. Ruba remarked, ‘Blended mobile learning will increase the effectiveness of education and the learning process, because it could provide so many ways of learning—for example, learning through games.’

Moreover, Iman commented, ‘Perhaps it has both a positive and negative impact on the learning process. If the lecturer fails to manage the class well, it can delay the learning. However, if used correctly, it can make the educational process more effective.’

Aside from this, they mentioned that it might facilitate the learning process, as pointed out by Maha, 'I think it transforms the learning process for the better, as it is a new approach to learning, which helps facilitate access to information and the sharing of documents, making education easier. The negative aspect might be that it limits direct communication and interaction between teachers and students.'

Nevertheless, some of the participants declared that it would modernise the learning process. For example, Ebtessam commented, 'Blended mobile learning will move the learning process from traditional, boring ways towards more modern methods. In fact, this will suit students in the digital era.'

Arwa had a similar view, stating, 'The implementation of blended mobile learning may develop and improve the learning process, because the use of new technologies will enhance teaching methods, increasing students' understanding.'

Meanwhile, Samar's opinion was more focussed on the student's role in the learning process:

In my opinion, it will have a positive effect on learning in education, especially regarding the learner's role. Learners will be active and positive in the learning process. They will be able to search, share, and discuss information, not like in traditional education, where it is only the teacher who instructs the student. Instead, all students will be able to access information anywhere and anytime.

It is important to note that each participating student thought blended mobile learning could have a positive effect on the learning process and education, even though some of them mentioned that it could have some negative effects as well. One clear example of this is the possibility of reducing direct interactions between teachers and students.

The Effects of Blended Mobile Learning on Students' Academic Achievement

All participants agreed that the appropriate use of mobile devices in education could enhance students' academic achievement. Mai thought, 'I think if mobile devices are used in the right way in education, the learners will have higher academic achievement.'

Arwa added, 'Blended mobile learning will help deepen learners' understanding, so that their academic achievement will increase.' Mona said, 'I think the academic achievement will increase, since I have tried that and I noted big changes. In the past, we were not allowed to have mobile devices in classrooms, but now, everything is different in a good way.'

However, two students mentioned improper uses of mobile devices that could affect students' achievements negatively. Maha pointed out, 'It could have a positive influence, because of the expansion of information, extended access, and many available learning sources. However, it could also have a negative effect, such as some learners becoming dispersed. They may make them lose concentration and distracted by games or social networking apps.'

Rawa agreed: 'I think it could have a good effect by attracting students and enhancing their achievement in that way. On the other hand, it could have a bad effect and reduce [students' achievement], because students would be distracted.'

As a result, the participants agreed that there is a positive effect of blended mobile learning on academic achievement, although some were afraid that apps on mobile devices could cause a distraction. In fact, the academic achievement would show whether the educational goals were achieved and to what degree. This makes it very important for the students, lecturers, and HEIs.

Blended Mobile Learning Affects Students' Motivation

While one of the participants thought blended mobile learning would not have a major effect on students' motivations, most of them thought learning would be increased. With regard to this point, Rawa said, 'Maybe using mobile devices will get rid of boredom while learning. In fact, I don't think it has that big an effect on student's motivation.'

However, the rest did not agree with her opinion, with Ebtesam saying, 'The learners will have more motivation, and they will be excited more because of using new technologies and easy methods. In addition, Ruba said, 'Blended mobile learning will motivate students, strengthen their motivation, attracting them to study and be positive learners.' Maha said, 'It is possible to increase the learners' motivation to learn, because it is the era of technology.'

Mai added, 'If the mobile devices are used in the best way, that will increase learners' motivation for education. [What] I mean by the best way is taking into consideration the content type and learners' individual differences like pace of learning. Then, for each specific learner and each course, appropriate and useful apps can be chosen and used.'

Mona stated, 'I think it will increase the students' motivation. In addition to making students creative and positive learners.' And Samar believed, 'Because the learner will use his own device for learning inside and outside the classroom, which he uses through the day, he will be more comfortable and his motivation will increase.' Nuha thought, 'It will increase their motivation because it is a fun and modern way to study.'

In contrast, one of the participants mentioned the negative effect. Fawziah believed, 'It increases learners' motivation, making them excited to learn, and it increases their creativity. However, it may cause distraction and have a negative effect, because of improper use by some learners who play with it.'

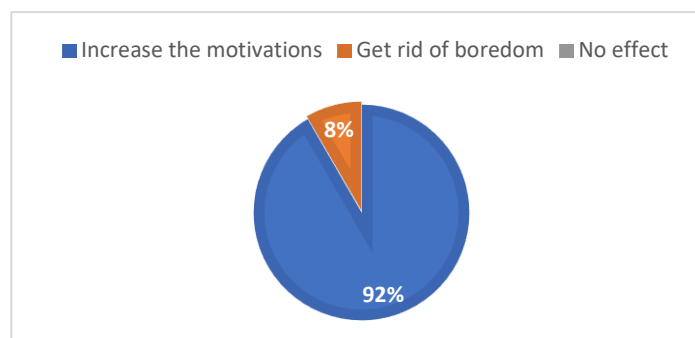


Figure 22 Effects of blended mobile learning on students' motivations

Most of the participants had a positive opinion about using blended mobile learning in relation to its ability to increase their motivation to learn, mainly because it adds fun, increases attraction and excitement, reduces boredom, and makes students comfortable, positive, active, and creative. Therefore, most of them thought positively of its effects on the learning process and academic achievement. However, some of the participants were doubtful of its positive effects and thought that mobile devices could cause distraction due to improper use.

In summary, the data on performance expectations from blended mobile learning demonstrates that while a majority of students have high performance expectations, others do not. The performance expectation is dictated by various factors, such as

internet accessibility, mobile device ownership, and the required skills. Although most of the students experienced internet accessibility problems both on and off campus, they are currently able to access the internet from home and within the campus. HEIs do not always provide internet access to the students, and some parents have gone an extra mile to provide internet access to their children.

All 12 students own at least one mobile device, and this implies that it is not a challenge for the typical higher education student to obtain and own a mobile device. These devices give the students access to a variety of learning materials and ability to send and receive them. Consequently, some own devices such as iPads, which are also useful in the learning process. Considering how the mobile devices are designed, almost all the students find it easy to use this new learning technology. However, there are some who argue that they have not acquired the necessary information and communications technology (ICT) skills, and this presents a challenge to blended mobile learning. In conclusion, amongst the 12 students interviewed, the majority have high performance expectations, while a few have low performance expectations.

Effort Expectancy

The students expressed their opinions on the effect of blended mobile learning on the learning effort shown by students.

Mobile blended learning has profound effects on the learning efforts of students. Their opinions on this issue differ: some express high effort expectancy, while the others view it as something that lowers their effort to learn. Blended mobile learning has smoothed the process of learning by making the teaching methods simple and enabling access and sharing of learning materials amongst the students (Alenezi, 2017). The fact that the students can access a variety of learning materials on the internet via their mobile devices motivates them and increases their learning effort expectations.

However, this simplification of learning and access to learning materials could negatively affect the learning effort expectations of some learners. Some of the students may find learning easy and put in little to no effort. Arguably, the availability of learning resources on the internet may lower their creativity and learning efforts, because they now have fast access to answers and what they need (Alowayr et al.,

2016). In addition, the use of gaming apps for learning can distract some students from using the mobile devices appropriately and, thus, lower their expectations of learning efforts. This study is important, as it gives us the general view of the effects of blended mobile learning on students' learning effort expectancy. Previous studies acknowledge the positive impact of blended mobile learning on the student's effort expectancy and argue that it had little or unknown negative impacts, unlike this study, which has discussed both positive and negative impacts.

Effects of Blended Mobile Learning on the Submitted Effort to Learn

Most of these students agreed that the use of mobile devices would make the learning easier and also save time. They said mobile devices have the ability to connect students to unlimited knowledge through simple taps on a screen. The use of mobile apps made their lives easier and eased their education. However, some students thought that if educators and teachers asked students to use unfamiliar apps, it may cause them difficulty. They suggested using simple, clear apps that suited all.

Effects of Blended Mobile Learning on the Lecture Halls

In order to better understand the effort expectancy, the students were asked how blended mobile learning could change classrooms and lecture halls. The figure below presents their opinions.

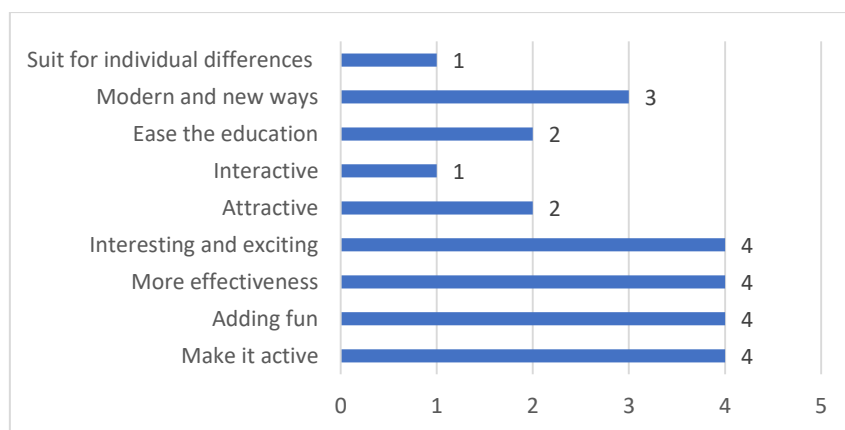


Figure 23 Effects of using blended mobile learning in the classroom

The participants commented positively about the effect of implementing mobile devices in the classroom. The main effect mentioned was that it makes classrooms more active, effective, interactive, fun, interesting, and modern. For example, Ebtesam

stated, 'I think using mobile devices in the classroom will make classrooms modern, as there is the potential to add some new and easy ways of gaining knowledge.'

Similarly, Samar claimed,

Using mobile devices in the classroom to support students' learning has many positive effects, in my opinion. The classroom becomes more modern, active, fun, and interesting, because mobile technologies offer numerous modern ways of learning and if students use the devices that they like, are familiar with, and use every day, learning will be much easier and interesting for them.

In addition, Iman commented, 'Using mobile devices in the classroom will help ease the transmission of information, which will make the learning environment better.'

Arwa said, 'I think, as mobile devices have become so important in everyday life, they will be an important and useful tool in the classroom. They will make classrooms more attractive and effective and help teachers, making the lessons more interesting.'

Mona felt the same way: 'Mobile devices add fun to the classrooms and make students interested and excited about learning in the classroom. They will increase the effectiveness of the classroom by introducing new learning methods.'

Furthermore, the participants asserted that blended mobile learning would support students' learning and understanding within the classroom as well as solve the problem of individual differences between students. For instance, Fawziah stated, 'Mobile devices would be a great addition to the classroom. They would increase creativity in the classroom, as they take into consideration the individual differences between students.'

However, one student, Noha, mentioned a negative effect of using mobile devices in class: 'Mobile devices have many positive effects on the classroom; for example, students can access uncountable amounts of information and resources. However, they could also have a negative effect, because it might be difficult for teachers to keep order amongst their students.'

Most of the participants expected blended mobile learning to have positive effects on the submitted effort to learn. They thought it would ease the learning, add some fun, and make it more interesting. However, one of the participants pointed out that the effort may cause problems for the teacher.

In summary, while some students have high effort expectations, others show low effort expectations. Nearly all 12 students acknowledged they shared the former. This is due to the wide variety of learning materials that can be accessed on the internet and the ability to share the materials with fellow students. This allows them to put more effort into learning, as they can access learning materials anywhere and at any time. Moreover, the fact that the students and their peers owned more than one mobile device implies that they can access unlimited knowledge from the internet, thereby increasing their submitted efforts to learn. The majority of the students has the relevant ICT skills to enable them to navigate the internet and access broad knowledge. However, the use of sophisticated and familiar learning applications by the instructors negatively affected the submitted effort of the students to learn.

Habit

Another UTAUT factor considered is 'habit'. The participants discussed their daily habits and interests when using their mobile devices. Indeed, in this era of new technology, the use of mobile devices has become an everyday occurrence in Saudi Arabia, regardless of the users' age. Mobile phones are used for blended mobile learning as well as communication.

With all the students owning mobile devices, it becomes nearly impossible for them to go a day without using them (Alharbi et al., 2017). Most of the students find it fascinating and fun to browse the internet for diverse learning materials and sharing with their peers (Alenezi, 2017). Moreover, the use of familiar apps makes the students more interested in using their mobile devices for learning. This study demonstrates the students' behaviour towards blended mobile learning and their habits and feelings about using mobile devices daily. This study differs from previous studies that show that most of the learners use their mobile devices everyday but are distracted from learning by such things as gaming.

Time Spent and Duration of Mobile Use per Day

It was important to investigate how much time the students spent using their mobile devices. This would give a clearer idea about students' habits and preferences regarding mobile devices. However, not all educators consider education the reason for students' excessive use of mobile devices. Nonetheless, if students enjoy using their mobile devices and dedicate a great deal of time to this, then educators should perhaps rethink the adoption of mobile devices in education, in alignment with students' preferences.

The shortest amount of time spent using a mobile device per day was one to two hours, while the longest time was 10 hours. Ebtasam estimated 'one or two hours every day', while Nora calculated 'at least one or two hours, and sometimes [it] could be more.' However, Fawziah and Arwa said that they spent around three hours using their mobile devices daily, while Mai mentioned three to four hours; Iman and Mona said four to five hours. In contrast, Maha responded, 'Actually most of the day.' But when asked to specify the hours, she replied, 'The minimum is five hours.' Rawa and Noha declared that they spent slightly longer, namely six to seven hours using mobile devices, with Ruba similarly citing her usage as seven hours per day. Finally, Samar claimed that she used her mobile device for up to 10 hours per day.

Consequently, the participants typically use their mobile devices every day. They expressed their attachment and how they depend on their mobile devices. It is more than a tool for making and receiving calls and messages.

It is clear that almost all the students use their mobile devices for daily learning as well as communication. Of the students questioned, there are some that spent most of the day on their mobile devices and others that spend around one to two hours a day on them.

Most Commonly Used Mobile Apps

When the students were asked about the apps that they used and liked the most, they mentioned similar ones. Ebtasam said, 'I like social media apps like WhatsApp and Twitter, and of course, I use the email app for my academics. In addition, I like reading the news on some news apps, and I also search for things using web browser

apps. Moreover, I love taking photos with my phone camera and editing them with a photo app.'

Nora stated,

I use social media apps a lot; for example, I check my phone frequently for new updates and mentions by others on Twitter, Instagram, Snapchat, and Telegram. I also benefit from apps that facilitate my life, like Ajeek for restaurant menus, orders, and deliveries. Moreover, I use maps for navigation and to find out locations, and I use Careem, which is an app to call a cab. Sometimes, I shop online using shopping apps like Faces, which is an app for a make-up store.

Ruba claimed, 'I like reading books and so I use apps like Goodreads and Pocket. In addition, I follow some interesting accounts on social media, so I use apps like Instagram, Twitter, and Snapchat. I also interact with people online on WhatsApp and Telegram, and I watch videos on YouTube almost every day.'

Iman added, 'I have used WhatsApp, Snapchat, and Twitter as social media apps. I am also a member of work, family, friends, and relatives' groups on WhatsApp. Moreover, I follow various famous people's accounts on Snapchat and Twitter. In addition, I sometimes play games on apps like Jalsah and Ludo.'

Maha stated,

I use the Gmail app for sending and reading my emails. I also use the Google Translate app a lot to translate new vocabulary and sometimes to find out how to spell certain words. In addition, I use conversation apps like Speaky. Moreover, I browse and buy books from apps using Amazon and Jarir (bookshop). Besides, I use social media a lot like WhatsApp, Twitter, and Facebook.

Fawziah said,

I use the Notes app, and I like it so much, as I can write down everything that I want with no need to carry additional tools like pens and notebooks. I like using social media apps like Instagram and WhatsApp.

I listen to audio using the SoundCloud app, and I use delivery apps like Marsol—I can order anything from shops with this app and their staff will deliver it to my location.

Rawa explained,

I use web browser apps such as Safari, and I use an iBooks app for reading and saving PDF books and files. I also use the university and email apps for my academics. I prefer to read the Holy Qur'an on my mobile device and use religious apps. I use WhatsApp to talk and chat to people. Moreover, I like how YouTube has millions of interesting videos that I spend hours watching. In addition, I use a translation app, and I enjoy using social media apps such as Instagram and Twitter.

Mai mentioned similar apps: 'I usually use social media apps like Twitter, Snapchat, and WhatsApp. I also use YouTube a lot for watching videos. Sometimes I use Uber, which is an app to book a car and driver, as well as the Amazon app for online shopping. I read PDF files and books using the iBooks app. I also use maps, weather, and camera apps.'

Arwa was not that different:

I use WhatsApp every day for communicating with people I know. I use iBooks for saving and reading books and documents. I also depend on some apps like Ajel for reading about local news. I use Snapchat for making videos or taking photos to share with my family and friends as well as following some famous people from different countries around the world. I use Instagram in a similar way to Snapchat. In addition, I use Maps for navigation and to find out the traffic status.

Samar declared that she used her mobile device effectively to make her life easier and she liked using a variety of apps:

I depend on WhatsApp for communication with people, as everyone I know is on it. I use social media apps such as Twitter, Snapchat, and Instagram. I also check the forecast using the Weather app. I use Google Maps for directions and to find locations. In addition, iBooks is

important to me for reading and saving PDF documents. In fact, I like to listen to audio via SoundCloud and podcasts. In addition, I use my phone camera and photo editing apps sometimes. I also shop online using apps like iHerb, JD, Jollychic. Besides, I manage my finances via a banking app, and I recently used a barcode reader to find out some information about products. Additionally, I like restaurant apps like Dominos Pizza and food delivery apps like HungerStation.

Similarly, Noha stated,

I like using the Facebook app and WhatsApp to contact my friends and family wherever they are in Saudi Arabia or abroad. I use an email app for my studies, and it is easy to use, because my mobile device is with me most of the time. I use Maps, because I do not know this area very well. Sometimes, I use Twitter to find out local and world news and to follow some interesting accounts. I like using the Google Translate and iBooks app.

Finally, Mona claimed,

I check the weather forecast via the Weather app. I use Maps for navigation. I like to take photos with the camera on my device. I search for information using Safari which is web browser. I communicate with people via WhatsApp and Tango (a video calling app). I like shopping online using apps like Namshi (a shopping app), Amazon, and eBay. I use Mega for sharing large documents, I watch videos using the YouTube app, and I use social media apps like Instagram, Path, Jodel, and Tumblr.

The results show that the students mostly used social media apps, especially WhatsApp. In fact, WhatsApp is the most used app for communication in Saudi Arabia; WhatsApp groups have become a cultural phenomenon.

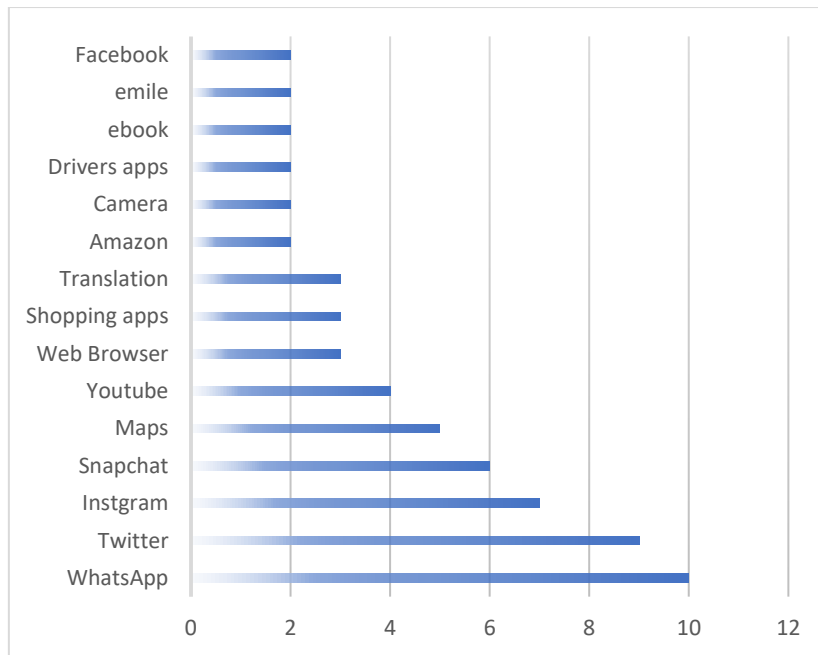


Figure 24 Apps used most by the students

Types of Information Students Usually Search for on a Mobile Device

The participants discussed how they used their mobile devices to search for information. They each used their mobile devices to search for something and said that it was easy to find information with a mobile device at anytime and anywhere; this information was storable and shareable.

Seven of the 12 participants stated that they used their mobile devices to search for information related to their research and study, with three of the students adding that they looked up other people’s research. For example, Ebtessam claimed, ‘I do searches with my mobile device. I usually seek information regarding my studies and research, like previous studies for my thesis, and some information from the university website.’

Nora said, ‘I like using my smartphone to look for papers and studies regarding my master’s research, especially the latest studies and articles about educational administration and that regarding to my research topic in my MA.’

Five of the participants looked at local or global news on their devices. Mai said, ‘I like to know about world news by exploring news apps or using a web browser app. Moreover, I like to get the latest information on current events.’

Another five students said that they searched for health or medical information on their devices. In relation to this, Fawziah explained, 'I usually search for information about health in general and nutrition. I like to read about healthy foods and diets. I can also find out about food calories, recipes, and advice. However, such information should be taken from trusted sites, blogs, or social media accounts.'

Besides this, three of the participants looked for shopping information and sales offers, with two searching for cultural information.

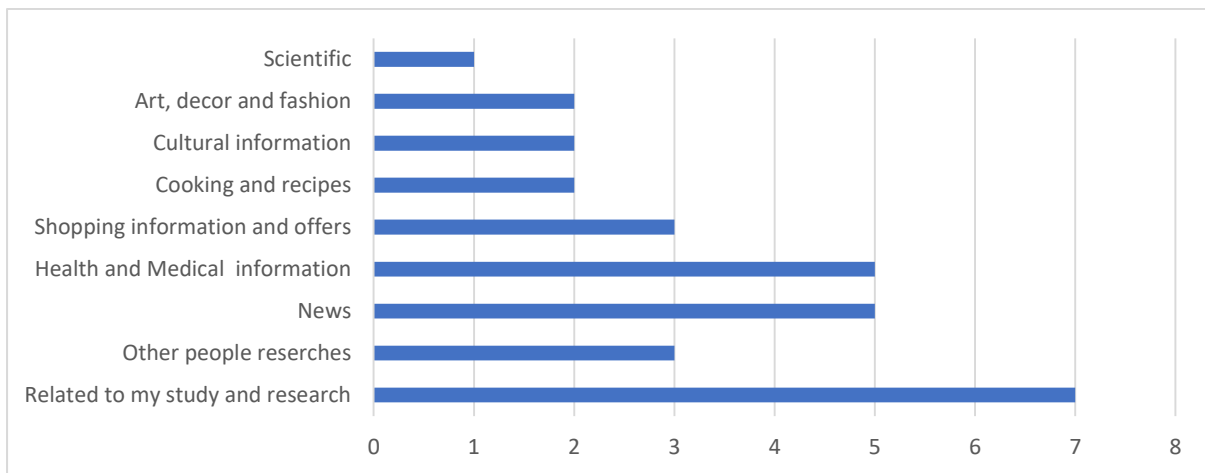


Figure 25 Types of information searched for by students on their mobile devices

Students' Use of Mobile Devices to Learn Something of Personal Interest

The participants discussed whether they had intentionally used their mobile devices to learn something of personal interest. While 11 of the students confirmed that they had, Ebtessam claimed that she had only used her mobile device to search for information related to her studies. In particular, it was most commonly agreed that mobile devices were helpful for learning a language. Four of the students stated this, beginning with Nora, who explained, 'I learn English by listening to the audio news and watching YouTube videos in English. In fact, there are many teaching channels with effective and fun lessons. Moreover, on a mobile device, I can access all world channels as they post reports, photos, videos, and some have a live online broadcast.'

Maha also spoke about using her mobile device for language learning:

I am interested in learning English. For example, I use the iconversation app, whereby I can chat with people sometimes and practice, and yes, I have fun. However, for sure, sometimes, the conversation can be boring

or could be about personal things, but the good news is that I can end this one and start a new one with a different person.

Mona, who tried learning languages with her mobile device, stated, 'Mobile devices and their apps are good tools for learning languages at your own pace while having fun.'

Meanwhile, three of the participants used their devices to learn about health. For example, Iman said, 'I follow many useful doctors who advise people and share a lot of information about health on Snapchat, Instagram, and YouTube. I can share my opinion as a comment under their posts or ask them something in a direct message, and sometimes, they look at my comment and reply or talk about it in another post.'

Samar added, 'I learn about babies and their health because I am a mother. I can meet other mothers using my smartphone and share information, our experiences, and advice.' Two of the students had also learned about web design, site design, or photo editing. Mona explained, 'I learn about photo editing and Photoshop, and about creating web pages and blogs. I can find the information on Twitter, YouTube, Instagram, and blogs. It is easier for me to learn using my mobile phone, as it is always with me, anywhere and anytime.'

Two of the students mentioned that they learned about cooking, with Arwa stating, 'Yes, I do. I learn cooking and about sweets. There are many YouTube channels, Facebook pages, and blogs, where I can choose recipes and learn to cook.' Two other students recounted they learn about make-up and fashion. Mai said, 'I have learned about make-up and fashion using Instagram, Snapchat, and YouTube apps. I can follow channels and accounts by experts in fashion or make-up. There are many girls in these apps posting tutorials and tips, which help me learn with a lot of fun.'

Aside from this, three of the students mentioned an interest in history, so they used their mobile devices to learn about different events and periods. These two students also expressed an interest in learning about religion and culture. Rawa stated,

I am learning the Qur'an [the Islamic holy book] using my smartphone. I use apps that help me with reading and memorising the Qur'an. I am

also engaged in a WhatsApp group with members who share my interest. Moreover, I like learning about history and watching documentary videos. I use YouTube channels and other sites. I also follow some people who are interested in history on Snapchat.

Fawziah, who is a teacher, declared that she used her mobile device to improve her job performance:

I use a mobile device and its apps to learn about teaching methods and learn design. In the internet world, there are many forums, where a lot of teachers and students can interact and share educational documents and resources. There are so many kind people who teach others, step-by-step. In fact, I like to read other teachers' experiences and share mine as well. In addition, I can leave comments and read other people's comments. All that, without needing to make yourself known or reveal your real identity.

Likewise, Ruba mentioned similar points, but generally commented, 'I learn from other people's experiences. People around the world are sharing their experiences everywhere on the internet, and my mobile device makes it easier to access these experiences. Actually, sometimes, I interact with them and leave comments. I hope one day I can share inspiring experiences like these that I like.'

Arwa illustrated that social media apps allow users to customise it as they want. She explained,

In fact, with social media apps like Instagram, YouTube, and Snapchat, you can make of them what you want. In addition, that can happen by following people and channels that suit you. For example, if you follow people who talk and post about health, it will be a health information app on your device. You can use it to play or to learn. Moreover, you can be a passive user by just receiving information from other users or an active one by adding some information and interacting with others.

The results above illustrated the good ways of using mobile devices as a learning tool. The students preferred to learn by using their mobile devices as opposed to using other methods. They found it easier, interesting, and suitable to their needs.

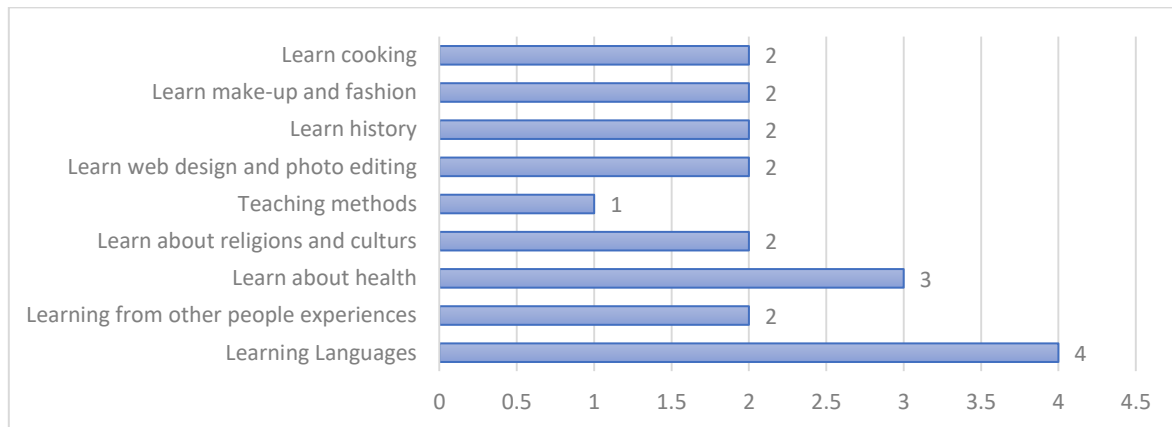


Figure 26 Students learning for personal interest using a mobile device

Academic Social Influence

Social influence is one of the UTAUT factors that could affect these students' acceptance. However, this study does not focus on the students' social lives, and so, the interview questions did not enquire about the effects of society on students and their acceptance of blended mobile learning. Nevertheless, some students did mention the importance of each individual having a mobile device to keep pace with the times. This was particularly the case, they said, in Saudi society where people are very interested in having the latest mobile technology. The participating students added that all of their friends own at least one mobile device and use its technologies and apps for communication and sharing course materials. They said that one of the disadvantages of mobile devices, unfortunately, is that they 'get old' in a very short time and new models appear.

With the increasing technology and internet accessibility on and off campus, the use of a mobile device for both learning and other purposes has increased. Most of the learners are using mobile devices every day, for anywhere from one hour to ten. They have developed an interesting habit of using their mobile devices every day, wherever they deem it suitable to browse and share learning materials. Moreover, the students use mobile applications frequently for different purposes. For instance, they use social media apps such as WhatsApp and Facebook to chat with their peers and share learning materials; web browsers to search for learning material and information;

shopping apps, such as Amazon to purchase books and Ajeek for orders and deliveries; and translation apps to translate new words as they read. They also use the internet to search for the news, research materials, and nutritional information. The students also use mobile devices frequently to teach themselves new skills, such as cooking and those related to science. The students have formed the habit of using their mobile devices regularly, thereby increasing their knowledge of the device and productivity and making habits an essential element of blended mobile learning. In conclusion, the formation of a good habit of using a mobile device is essential for blended mobile learning.

Behavioural Intention

The participants were asked some questions related to 'behavioural intentions', which refers to an individual's intentions to show or not show certain behaviours. In this regard, they were asked about their feelings about using their mobile devices for education with a lecturer's guidance. The significance of this information is to understand the behavioural intention of the learners when using mobile devices in blended mobile learning and how these intentions impacted the learning outcomes in higher education in Saudi Arabia.

All the students in blended mobile learning express positive intentions in using their mobile devices as a tool of learning. Most of the students use the mobile devices for their own good, as they use the internet to acquire learning material and information that is crucial to their research and studies (Alowayr et al.,2016). Others use the information on the internet to learn new skills, such as cooking, and to acquire more knowledge on particular topics, such as nutrition and world news. Others use their mobile devices for fun and recreation by watching YouTube videos and gaming (Davie & Hilber, 2017). The students' feelings about using their mobile devices for education with the guidance of lecturers vary. While some have positive feelings on the use of their devices, others think they should be left to use their mobile devices according to their needs and what excites them.

Students' Feelings about Using Their Own Mobile Devices for Learning with the Lecturer's Guidance

All of the students shared a positive attitude towards using their mobile devices for education with their lecturers' guidance. Iman commented, 'I strongly support and

agree with students using their mobile devices in the classroom with the teacher's guidance.' Mai remarked, 'It is a good thing to add some new modern methods to formal education that will lead students to a deep understanding of knowledge and information.' However, five of the students emphasised the importance of the lecturers' guidance. For instance, Mona said,

That is very important these days, and teachers' guidance is necessary for ensuring the success of the learning process. Without guidance, students may use their mobile devices for something that is not related to the class. Moreover, some of the students may be unable to figure out how to benefit from using mobile devices in their education. In my opinion, teachers should be trained to prepare them for adopting blended mobile learning effectively.

Thus, all the participants feel good or excellent about using their mobile devices in education. They also felt the lecturer's guidance is important for increasing their discipline and ensuring the success of the learning process.

Students' Feelings about Downloading Apps to Support Their Education

Most of the participants felt 'good' or 'very good' about downloading apps to enhance their academic performance. However, two had negative feelings about this. For example, Ebtesam claimed, after giving it some thought, 'Personally, I would rather not download unfamiliar apps.' Mai declared quite unequivocally, 'Not a good feeling. Honestly, I mean a bad feeling. I prefer using my laptop over my smartphone because I like working and studying on large screens.'

However, 10 of the students expressed positive feelings about downloading apps for academics. For instance, Samar stated, 'Excellent feeling, really, I think that it is useful, especially when the apps are free and in Arabic.'

Some of the students, like Rawa, specifically mentioned certain apps: 'I feel very good about downloading apps to support my studies. For example, I would like to use apps for translation, presentations, and video downloading, creation, or recording in the classroom, and [if I find] any app that will make my studies easier, I download it immediately.'

Nora also added, 'I feel very good about that. For instance, using a Papers 3 app will help me find and share research. Moreover, social media apps like WhatsApp groups can be used for conversations and knowledge sharing inside or outside the university.'

Ruba felt, 'I have good feelings about downloading apps to support my studies and improve my academic performance. For example, I like to use PhotoMath, Twitter, and Telegram as well as any new apps that will expand my knowledge and skills.'

Therefore, most of the participants feel good about the idea of using their own devices and downloaded apps with their lecturer's guidance. However, some said they would not feel good because of the small size of their mobile device and because they are not willing to use unfamiliar apps.

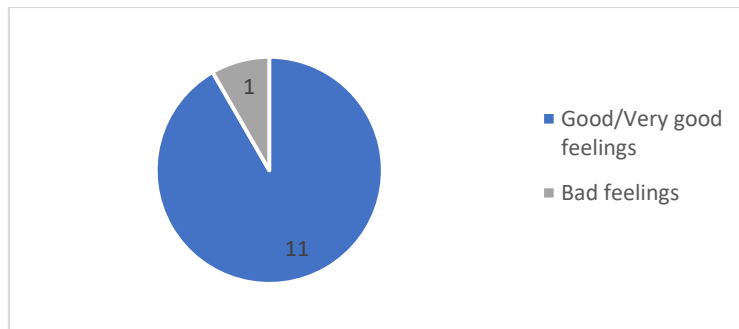


Figure 27 Students' positive and negative feelings about the educational use of apps

Summary of Behavioural Intention

Most of the learners displayed positive behavioural intentions towards the use of mobile devices for learning. Most of them admitted that they benefit from using their mobile devices for learning. They use their devices to access information and learning materials from the internet and store or share it with their peers. There are still those who use their mobile devices for fun and to play games; in other words, they use their mobile devices for other purposes than learning. Through the guidance of the lecturers, these students' intentions for mobile devices could change from negative to positive. The students use various applications on their mobile devices specifically for blended mobile learning. They use social media apps to converse and share information with their peers, translation apps to translate new words when studying, and shopping apps to purchase books and other learning materials.

In addition, most of the students were happy about and supported the idea of their lecturers guiding them on using their mobile devices to learn; the rest were not comfortable. The supportive and happy students believed that the lecturers instruct them to use their phones effectively. The other category of students, who were unhappy about lecturers guiding them on how to use their mobile devices, thought some of the applications used were unfamiliar; they argued that they preferred larger screens for studying.

Educational Experiences

The next factor considers the students' educational experiences, which refers to what the students have experienced of blended mobile learning in previous courses and classes. This includes their experience of contacting other students and lecturers for their education. Previous studies showed that most of the students who experienced blended mobile learning were satisfied with the courses and would be even more

satisfied if all their studies, including Arabic language courses, were taught in this manner. However, the students were dissatisfied when courses that needed illustrations and a lecturer's explanation were included in the blended mobile learning; they felt these subjects should be taught F2F (Al-Azawei et al., 2020).

In addition, the students were dissatisfied with some instructional strategies incorporated in blended mobile learning. When it comes to traditional ways of teaching and online instructions through F2F sessions, digital learning materials, syllabi, marking rubrics, online assignments, and online discussions (Alenezi, 2017), the students need more interaction from their lecturers or their education can suffer. This section will analyse the place of blended mobile learning for both learners and the instructors in Saudi Arabia. Previous studies establish that most of the students express satisfaction with blended mobile learning, as they consider it effective.

Students' Previous Experience of Using Mobile Devices for Educational Purposes in the Classroom

Three of the 12 students said that they had no previous experience in using mobile devices in the classroom. Rawa stated clearly, 'No, unfortunately, I have not used it in the classroom or lecture hall for educational purposes.' She explained this further,

We cannot turn on our devices in lecture halls without the lecturer's permission, especially if she is female, because male lecturers are not usually in our lecture halls. They give lectures using network, screens, speakers, and a mic. Honestly, if we used our mobile phones to send, receive, share, view, or read materials, it would be much easier than viewing everything on the screens.

Some of the students confirmed that they used their mobile devices to run personal searches that help them with their learning. For example, Ruba said, 'I usually use my mobile phone to view presentations and documents, and sometimes, I check some apps. I have never used it with the lecturers' guidance.'

Iman described a similar use of her mobile device, stating, 'I use it to present documents and presentations,' while Maha explained, 'I write down some notes in my mobile phone and do a presentation in class using a mobile app.' However, Fawziah declared, 'I use many apps in the classroom for Maths; for example, the Calculator.'

In addition, Arwa claimed, 'I use my smartphone for recording the lecture, viewing presentations, and looking at course materials.' Similarly, Mona stated, 'I use a mobile device to search for information regarding lectures, translate some English terms, and look at books or class materials.'

A few students experienced using their mobile devices with the lecturer's permission and guidance. For example, Ebtessam cited one instance: 'I remember I used it once in the lecture hall. A lecturer allowed the students to use [a mobile device] to search for information about water, and we answered the lecturer's question immediately in the lecture hall.'

In addition, Samar stated, 'I have used a mobile device to share course materials with classmates, share our presentation slides, and run some information searches regarding lectures, and we have conversed this way.'

Noha added, 'One of my lecturers would send the lecture presentations to us before each lecture. Then, I used them to follow him in the lecture hall with my mobile device, instead of looking at the screens far away, which helped me a lot.'

A few of the participants did not use it at all. However, most of them were using their mobile devices for personal reasons while inside lecture halls. A few of them indicated one experience of using mobile devices with the lecturer's permission. Clearly, using mobile devices officially in higher education is rare or in its early steps.

Students' Opinions and Experiences with Regard to Contacting Lecturers and Fellow Students via Mobile Devices and Their Apps

All the students had positive opinions of communication with their lecturers and other students via their mobile devices. Some cited it as important or even necessary. For example, Fawziah commented,

Communicating with other people via my mobile device is very important and irreplaceable for me, especially for my study. I say that, because I carry my mobile phone with me all the time. I can contact others and check if someone is contacting me. Besides, I always prefer using apps for sending and receiving messages, rather than doing so through phone calls or emails.

Other students described mobile devices as tools that made it easy, convenient, or accessible to contact others, with Ebtessam stating, 'I like communicating with my lecturers and my supervisor via mobile device apps to ask questions, receive information, and offer my responses. This makes things easier for me and relieves the inconvenience of face-to-face meetings every day. Moreover, these apps facilitate communication with other students.'

Nora added, 'It is very convenient and saves time and effort,' while Ruba shared the same opinion: 'Communication via mobile devices is very useful, reduces the time and effort spent, and does not require a specific place or time.'

Maha said, 'Communicating via mobile technologies is easy and accessible for both the senders and the receivers. I mean, the learners can communicate with each other or with their lecturers at any time, like when they are travelling, and from anywhere, like if they are in a car. This saves time as well as facilitates and supports their learning.'

Conversely, all the students stated that they had communicated with others via their mobile devices for their academics. In fact, they communicated with their supervisors, professors, lecturers, and peers. Ruba specified, 'I mainly communicate with my lecturers when I have questions or with other students on the same courses as me in order to discuss academic tasks and projects and to send or share papers, presentations, and assignments.'

Rawa stated, 'I send emails using the Gmail app. I also use WhatsApp to join group conversations, whereby I have asked some questions, helped other students by answering their questions, and shared course materials.'

Mai added, 'I use social media and email apps for communicating with teachers and other students, sending and receiving information and materials about current courses, and arranging meeting times. My classmates and I help each other, especially while working on projects or preparing for exams.'

Samar also stated,

I have communicated via mobile device apps with my professors, lecturers, and other master's students enrolled in the same programme

and courses as me to share resources, presentations, links, or papers. Besides, when we worked together on some projects as a group, we communicated a lot to get all the work done. In addition, we usually find out about seminars and conferences through announcements that we receive via mobile apps.

Mona then explained, 'First, we have WhatsApp groups for each class with the lecturer and students. We use the groups to converse, ask questions, answer other students' questions, find out about any changes to class times, and share resources. Second, I sometimes communicate with my supervisor about my research via WhatsApp and email.'

The participants were asked about the apps that they used the most to communicate with their professors, lecturers, and peers. They all mentioned WhatsApp, and they were members of WhatsApp groups. Seven students mentioned they had used email via an app, while two of them communicated through phone calls. Besides this, one student had used the Telegram app, while another had used Twitter for this kind of communication. For instance, Fawziah remarked, 'Actually, I communicate with other students who take the same classes a lot. We have created an email and WhatsApp group. The professors are also involved in these groups.'

It was unexpected to find out that one of the most popular methods for communicating about school is social media apps, such as WhatsApp, since they are not created for an academic purpose. The participants commented that they used WhatsApp often because it is easy to navigate, allows immediate replays, and provides group chat functions. They also use it, because it is very popular and most of the people in Saudi Arabia frequently use it.

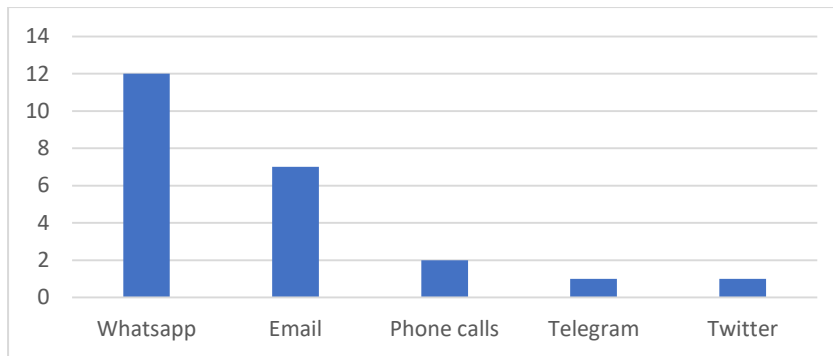


Figure 28 Most commonly used mobile apps for communication

From this data, we can draw the meaning that mobile devices are vital for communication amongst both students and lecturers. All the students remain positive about using mobile devices and apps to communicate with their peers and lecturers.

In summary, the students feel positively about using their mobile devices to communicate with their peers and instructors in a blended mobile learning setting. They embrace the use of mobile devices in the context of learning. The majority of them have mobile apps, such as WhatsApp and Gmail, on their mobile devices already. Ebtesam believes that using mobile devices to communicate with lecturers and peers is important in blended mobile learning, because the students can ask questions, receive information, and give responses. This boosts the students' performance.

Moreover, considering the ease of using these technologies and the accessibility for both the sender and receiver, mobile communication in learning is more useful and reliable and reduces the time and effort used in their education. Class groups involving the instructors are formed on mobile applications such as Gmail and WhatsApp. The students use these groups to obtain information that is relevant to their course, ask questions, receive assignments, and share learning materials. When working on class assignments, projects, and presentations, the students make use of mobile communication when coordinating and sharing ideas. Additionally, some of the students use phone calls to communicate with their supervisors, lecturers, and peers. The students find their mobile devices very useful for communicating as they can ask, receive, send, and share learning materials relevant to their courses.

5- Important Features of Mobile Devices that Suit Blended Mobile Learning

There are some important features of mobile devices that must be considered in relation to the blended mobile learning environment. The first feature mentioned by seven students was having enough memory. For example, Ebtesam said, 'It is very important for mobile devices to have enough memory to save data and information and files.' In addition, Rawa had a similar opinion and said, 'It must have good memory to download apps and save course materials.'

Five students stated that an important feature is having a large screen. For example, Mai said, 'A large screen is a very important feature. I really do not like using my smartphone for reading, because it is too small for me.'

They also require good apps, a long battery life, and a good internet connection. Two students mentioned these features. Samar said, 'Mobile devices must have good internet connection, large memory, big screen, and headphones. In addition, the apps should be easy to use and learn to fit the learners' level, ability, and technology's skills.'

Some features were mentioned but only by one student. For example, Ebtesam said, 'The mobile devices should have high processing power to access learning content fast and provide easy access to research websites. Additionally, the device and its apps should support many languages, especially the Arabic language.'

Mai said, 'Using electronic books instead of hardcover books will reduce costs. Besides, students will not have to carry heavy books and other hard papers. In addition, the learning process will be better for students.'

All participants indicated at least one feature they found important for mobile devices. However, they did not indicate features, such as push notifications, clear interfaces, or easy interactions with peers, which could directly affect their education and learning.

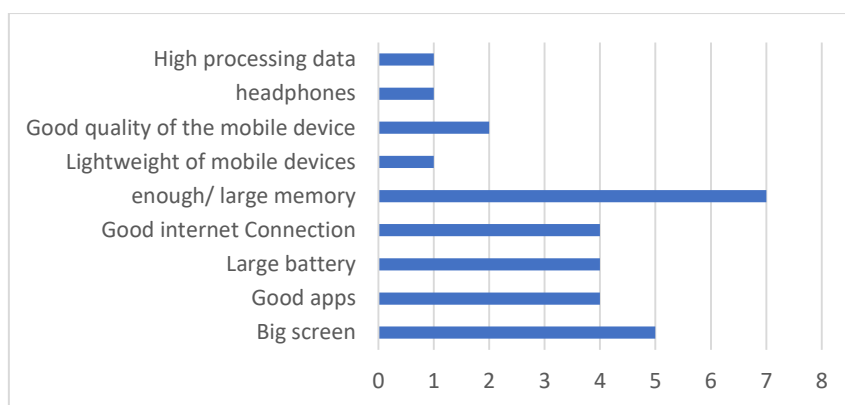


Figure 29 Important mobile device features that are useful in blended mobile learning environments

In summary, the students believe that the most important feature in a mobile device used for learning is enough memory. Ebtesam and Rawa asserted that the importance of sufficient memory is to ensure that the mobile device has enough space to save data, information, files, downloaded apps, and course materials. Some students prefer mobile devices with large screens in order to properly read on them.

Additionally, for a mobile device to be suitable for use in blended mobile learning, it must have good apps, a long battery life, and an excellent internet connection. Some students, such as Samar, mentioned these features are important for any mobile device used in blended mobile learning. They feel the apps should be easy to use at their level, for their ability and technological knowledge. In addition, the mobile devices need a fast processor to rapidly help them access information and easily access websites. Consequently, its apps should support many languages, especially Arabic.

In conclusion, having a mobile device with all of the above features ensures the smooth facilitation of learning in Saudi Arabia's HEIs. However, it is unclear what feature could impact education and learning the most.

6- Barriers to Adopting Blended Mobile Learning

Most of students feel that their teachers or lecturers are one of the main barriers making it difficult for them to adopt blended mobile learning. Iman, one of seven participants who mentioned this barrier, said, 'I think the only barrier is teachers who prefer the traditional ways more than any other new ways, including using technology, maybe because teachers are not trained on this modern education and apply what they have learned and used to do. I think they think the traditional ways of teaching are easier or more effective.'

Fawziah said, 'New educational methods are not activated by teachers who do not like evolution and are not familiar with modern technological devices and how to adopt them in education.'

Nuha stated, 'Teachers who do not know how to manage classrooms with mobile devices will prevent the adoption of blended mobile learning.'

Mona felt similarly, stating, '... low awareness among teachers and students will challenge blended mobile learning.'

Five students presented high costs as one of the main barriers of blended mobile learning. For example, Samar said, 'The high cost of mobile devices and their accessories—for instance, the mobile devices usually have small battery not enough for all classes. For that, students have to bring an additional power bank.'

Maha said, 'The inability of students to afford the cost of mobile devices with the internet.' Further, Mona said, 'Maybe the high cost of new technologies and rapid development of mobile devices.'

The students mentioned the technical problems of mobile devices as another barrier. For example, Rawa said, 'There are many barriers, like bad network connections and easily damageable mobile devices.' In addition, Ebtessam had a similar opinion regarding technical problems and said, 'It is easy to lose data if the mobile device is destroyed.'

On the other hand, some students indicated that the misuse of mobile devices by students is one of the barriers. For instance, Mai said, 'Bad uses of mobile devices, such as chatting and playing instead of studying.' Arwa voiced her concern, 'Perhaps some students will play with their devices, and not studying will prevent the success of blended mobile learning.'

Most students were aware of some blended mobile learning challenges. In fact, most of them had mentioned the teachers as a barrier to blended mobile learning in higher education. That barrier was unexpectedly the one that was most mentioned, so this research will be expanded to include the teachers' or lecturers' views and opinions on this subject. These interviews created the need to seek more data from the lecturers

and more students, especially males, with different qualifications and from various departments.

The most suitable collection method is an open-ended questionnaire. It allows the participants to express their opinion and provide in-depth information with few limitations. The following section addresses the findings from the students' open-ended survey.

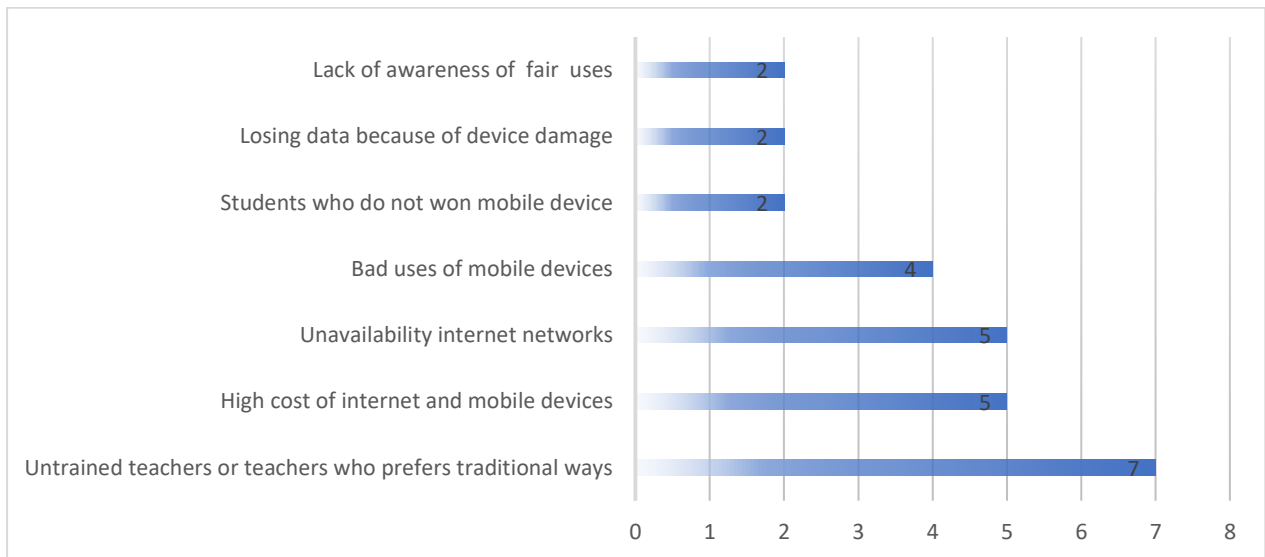


Figure 30 Barriers that can affect blended mobile learning

Summary

Most students thought that their teachers and lecturers were the main obstruction to adopting blended mobile education. Some students, like Iman, observed that the teachers obstruct this type of learning and prefer the traditional ways within their understanding. They avoid using new technology. Some of the reasons for this could be that they are not trained on blended mobile learning and they do not accept and embrace the evolution of technology.

Moreover, the teachers are not familiar with the new technologies and they do not understand how to incorporate it into higher education in Saudi Arabia. Some instructors specifically avoid adopting blended mobile learning, because they do not know how to manage their classes. In addition, high costs of devices and internet are a barrier to adopting blended mobile learning, and some students cannot afford these tools. Some students also use their devices improperly in the classroom by chatting and playing games; this is also a hindrance to adopting blended mobile learning. The

students saw lecturers and teachers as the main obstruction to adopting blended mobile learning.

Chapter Six: Analysis and Findings of Data from the Students' Open-Ended Survey

Introduction

The open-ended survey was conducted between April and November 2018 with a total of 72 students. Each survey took 30–45 minutes to be completed. I met with most of female participants in the colleges, explained the study to them, and took their contact information so that I could send the survey link to them. I also reached some participants through their lecturers. I asked lecturers to send the survey link to their students. Most of male students were too uncooperative to be a participant in this study. The survey questions are shown in an Appendix 7.

1- Jobs and Financial Income

Students' jobs	Number of students
No job	51 (70.8%)
Teacher in public schools	8 (11.1%)
Employee in a store or in sales	5 (6.9%)
Employee in universities	3 (4.2%)
Specialist speech and pronunciation	1 (1.4%)
Pharmacist	1 (1.4%)
Social worker	1 (1.4%)
Businessperson	1 (1.4%)
Prefer to not say	1 (1.4%)

Table 6 Students' jobs

The majority (51) of the students surveyed (72) were not employed, while the rest held various jobs. Those who held jobs were able to afford mobile devices and internet connections, while those without jobs depended on monthly university stipends of varying amounts, depending on their department. Even though some participants indicated the high cost of mobile devices as one of the barriers to blended mobile learning, all students said that they could afford to buy a mobile device; but most of them preferred not to spend more money on apps.

Because this study concerns 'bringing your own device' (BYOD), which refers to a type of blended mobile learning, the students were asked about whether they had jobs and about their financial income. The results indicate that most participants have no jobs. However, they stated that the university gave them monthly payments of 850 –1100 SAR, depending on their department. Even though some participants indicated the high cost of mobile devices as one of the barriers of blended mobile learning, they all said they could afford buying a mobile device. But most of them did not prefer to spend more money for apps.

The data above implies that the students own mobile devices, facilitating the adoption of blended mobile learning. Although the majority of the students lack jobs, they are able to purchase mobile devices through the university's monthly payments (Alenezi, 2017). Regardless of the high cost of the mobile devices, students strive to buy them, which facilitates the smooth adoption of blended mobile learning. However, some of the students do not prefer to spend much money on mobile applications. This presents a great challenge to the adoption of blended mobile learning in higher education of Saudi Arabia (Badwelan et al., 2016). This data is significant, because it shows us the relationship between the income of the students and their ability to adopt blended mobile learning. These findings are similar to those of previous studies.

2- Student Perceptions

Students' Understanding of the Term 'Mobile Learning'

The term mobile technology was familiar to most participants. First, of the 72 students surveyed, 27 knew that mobile learning entails using mobile devices for learning. For example, Buthaina said, 'Mobile learning is the learning that is done through mobile devices using its applications in education.' Second, eight participants responded that mobile learning is learning that can be done anywhere and anytime. As Bayan said, 'Mobile learning is getting information anytime and anywhere.' In addition, Jas said, 'It is the learning that gives students the advantage of learning in any place he could be.' Third, five participants said that mobile learning makes learning easier. For example, Nourah3 said, 'I do not know exactly, but it is the learning that makes the education easier.' Fourth, five participants said it is related to technology. Fifth, some said mobile learning is a type of distant learning. Additionally, one participant thought mobile

learning is a transfer of information, and another thought it is self-education. However, 21 participants did not know what mobile learning is.

In fact, mobile devices are usually called smart devices in Saudi Arabia and the term mobile devices is relatively outdated. However, the word 'mobile' in Arabic, with regard to mobile learning is similar to the word for mobile devices, so it was not difficult to understand the meaning from the word itself. The meaning could also be inferred, because all survey questions referred to mobile devices and their role in education. However, not all participants could be sure about the meaning, as 21 students said it was a new term for them.

Students' Understanding of the Term 'Blended Learning'

The participants answered a question asking what they knew about blended learning. The responses could be categorised into four types. First, the majority of the participants did not know what blended learning was. Second, 16 participants said that blended learning is blending electronic learning (e-learning) with traditional learning. Third, 11 said it is the integration of new technology with traditional learning. Finally, five participants guessed that it refers to the use of mobile devices along with traditional learning.

The word 'blended' does not have a specific meaning in Arabic, so it was difficult for all participants who did not know about the term before the survey to guess the meaning. However, after they had answered these questions, the participants were given the meaning of all three concepts so that they could understand and answer the following questions with the right understanding.

Students' Understanding of the Term 'Blended Mobile Learning'

The results show that most of the participants were unfamiliar with the term 'blended mobile learning'. Responses such as 'I do not know', 'I have no idea', 'new term to me', or 'I have not heard about it before' were given by 46 participants. However, 16 participants were familiar with the term or were able to understand by knowing the meaning of 'mobile learning' and 'blended learning', responding that it is the combination of traditional learning with e-learning by using mobile devices.

For example, Wafaa said, 'It is an education where both class learning and e-learning via mobile devices are used. It utilises educational apps and internet services to enhance the education, increase students' academic performance, and raise their achievement.'

In addition, five participants thought that blended mobile learning is using mobile devices in education, three thought it meant distance learning, and two participants wrote unique answers: 'It is a device transferring information to the future', and 'It is the use of mobile apps instead of going to the university'.

In fact, having 16 responses with a clear understanding and knowledge of mobile blended learning shows the participants' interest in adopting new technologies in learning, as all of them responded to other questions.

3- Confidence in Using Mobile Devices for Learning

All participants said that they have confidence and have enough skills to allow them to use their mobile devices successfully for learning.

4- Student Acceptance

This section concerns the factors that influence the acceptance of blended mobile learning in Saudi higher education. The following factors were determined by the unified theory of acceptance and use of technology (UTAUT).

Facilitating Conditions

The first factor of acceptance was facilitating conditions. In this study, the acceptance is determined by verifying whether the participants own a mobile device, whether they can access the internet easily, and how much time they can spend using mobile devices.

Access to the Internet

All students have access to the internet most of the time. However, the university allows just graduate students to access the university's free internet network. Therefore, most participants use their own internet. Additionally, all students have the ability to download apps. Most of the participants said that they need to be connected

to the internet most of the time. They added that they usually have their private internet connection. Nevertheless, some of them depended on Wi-Fi in their houses.

Free internet networks are not widespread in public places. Therefore, the communications companies sell many different options for the internet—for example, a portable mobile Wi-Fi hotspot with monthly payment, to which many devices can be connected. Furthermore, people usually ask friends or relatives for some network connection.

Mobile Device Ownership

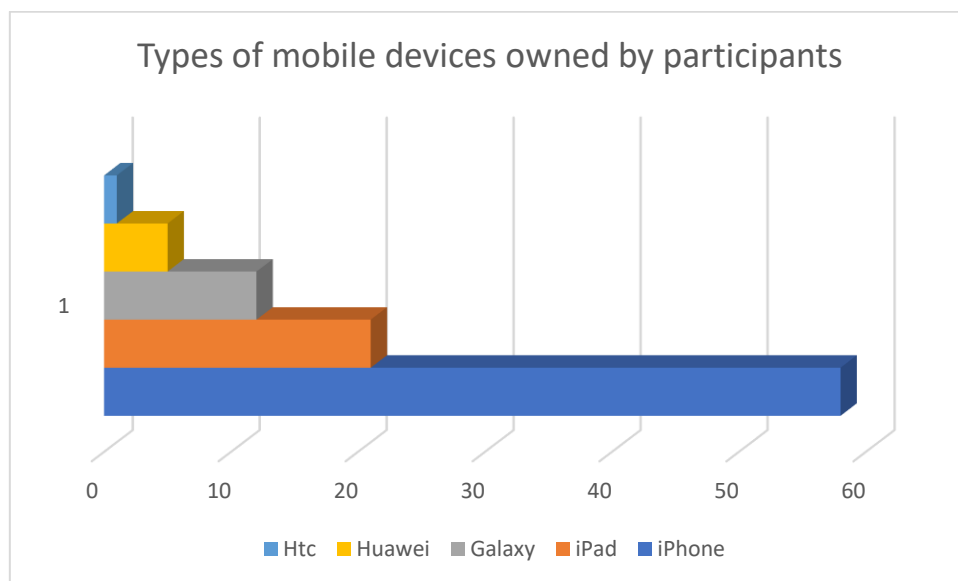


Figure 31 Types of mobile device used by the participants

All participants have at least one mobile device; they have smartphones. In total, 57 of them have an iPhone, and one of them has two iPhones. Moreover, 21 participants have an iPad, 12 have Galaxy smartphones, five have Huawei smartphones, and one has an HTC mobile phone. In fact, most people in Saudi Arabia started using smart mobile devices after the iPhone 4 was released. Even though there are many companies producing smart mobile devices, Apple still has many people who prefer its products.

Possession of a Laptop or PC

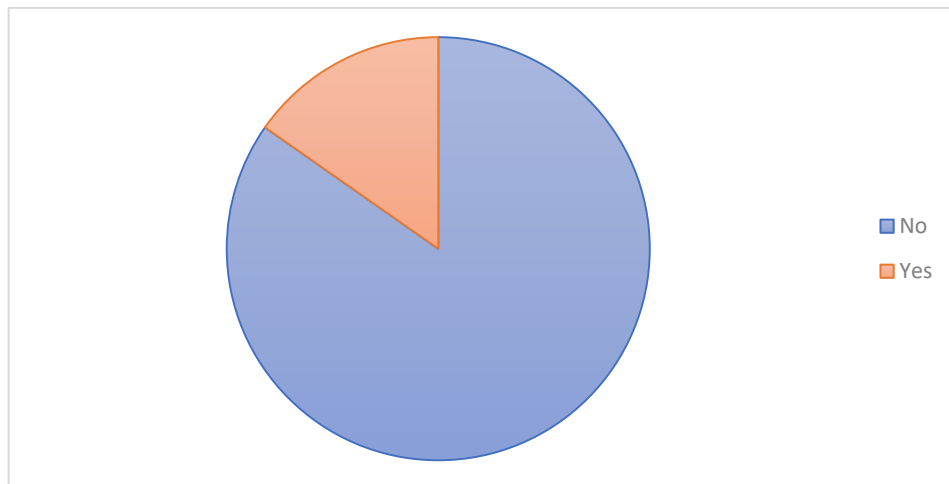


Figure 32 Pie chart of students' laptop or PC ownership

The students were asked if they have a PC or a laptop. Most of them (61) said yes, while only 11 said no. Those responding added that they did not need a computer device, because they use their mobile devices. The results showed that not all students need computers for their studies these days, because they use their mobile devices.

Time Spent Using Mobile Devices

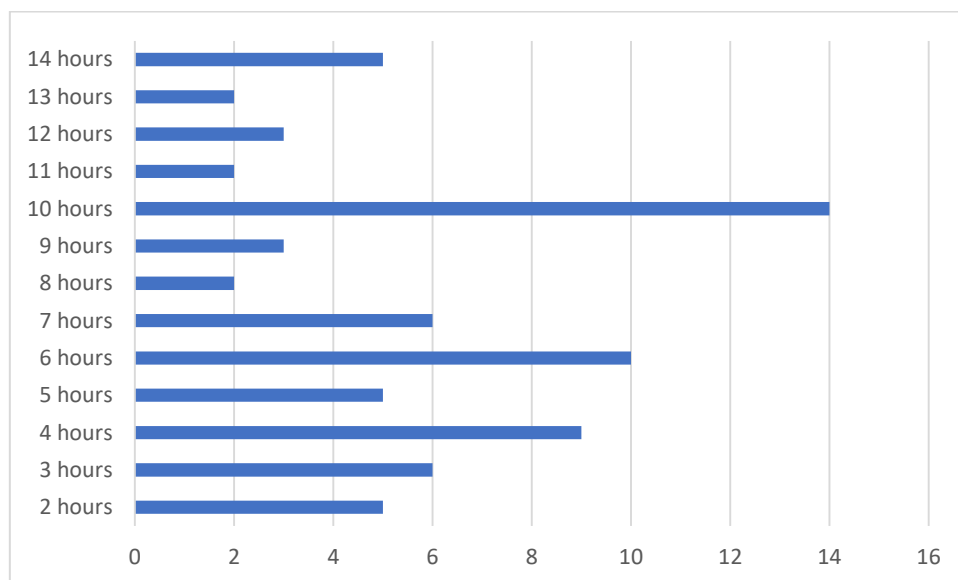


Figure 33 Hours spent on using mobile devices daily

The students were asked about how many hours they typically spend using mobile devices daily. The responses were varied—between 2 to 14 hours, with most participants saying that they use it for 10 hours daily. This may motivate the educators

to use mobile devices for academic purposes. The fact that there were 47 participants who spend six hours or more daily using their mobile devices indicates that the students depend on their mobile devices and prefer to use them for multiple tasks.

Academic Facilitating Conditions

For this factor, the students were asked about their lectures, on the internet, in lecture halls and on the university app.

Teachers Encouraging Students to Use Mobile Devices for Learning in Lecture Halls

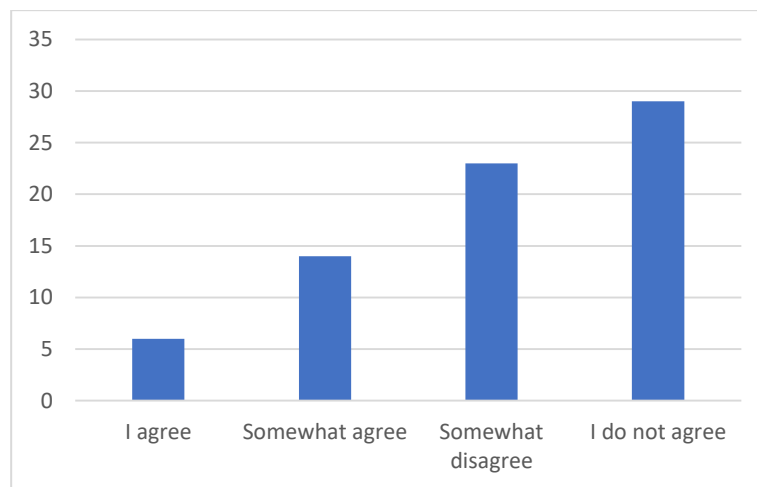


Figure 34 Students' agreement with statements about teachers encouraging them to use mobile devices for learning inside lecture halls

The majority of participants said that their lecturers were not encouraging the use of mobile devices in lecture halls. On the contrary, the lecturers may penalise students who use their mobile devices. They thought that the lecturers did not trust the students' usage of mobile devices.

Use of the University's Official App

Students' responses	Number of students
I benefit from using the app.	41 (56.9%)
I don't think the app is any good.	7 (9.8%)
I have not downloaded it.	15 (20.8)
I have never heard about it.	9 (12.5)

Table 7 Results of the question on participants' use of the university's app

Another question asked was how the participants had benefitted from the university's app. Unfortunately, not all participants appeared to have benefitted at all, as there were 15 who had not even downloaded the app and nine had never heard of it. Instead, they stated that they entered the website using a browser. For example, Batul declared,

Over three years ago, I downloaded the university application. I tried to check my results and grades, but that was unhelpful because of login and technical errors. Consequently, I deleted the app and opened the university website using Google Chrome to check my grades. Since this was easier and worked very well for me, I did not try to download that app again. Besides, I don't really know about the latest changes to it, as I still use the university website with the Google Chrome browser.

However, 7 participants thought that the app was not good or helpful. Wijdanah explained,

I do not think it or the Blackboard app is useful... honestly, it is supposed to facilitate our learning, but it has become dysfunctional, because first, there is not enough knowledge or awareness of the proper adoption of these apps. Second, there is a lack of availability of free internet inside the college, which is a major technical flaw. Third, not all students are allowed to open these apps in class to look at course materials, since the lecturer has some fears that students will open other apps. Therefore, I open these apps to download the course materials sent by the lecturer. Then, I can send them to the print shop using WhatsApp. I then take these as papers to class, as instructed by the lecturers. In the past, before these apps, the lecturer had just one copy of the course material for each student, and it would be taken directly to the print shop, where all the students could buy it. Technology was used in the wrong way, which made the process complicated. Even the university app and the website have just two main tools, one for adding or removing classes, and two for checking attendance rates. Except for that, it is useless for me.

On the other hand, 41 participants think that the app is useful, saying that they used it for arranging their timetable, registering for and deleting classes each semester, checking their attendance rate, looking at their grades, knowing exam dates, and viewing their study plans. For example, Ghena said, It allows quick access to databases and eases searches. In addition, I can easily view grades, add and modify my timetable, and print official letters and documents online without going to the university and waiting.

The app was produced in 2014, and it has a 1.9-star rate out of 5 on the app store. It is continuously developed to meet students' needs. Unfortunately, some of students do not know anything about it and do not even know that the university has an application. To achieve the goal of the app, the developers should consider these responses and reviews.

Facilitating Conditions in Lecture Halls

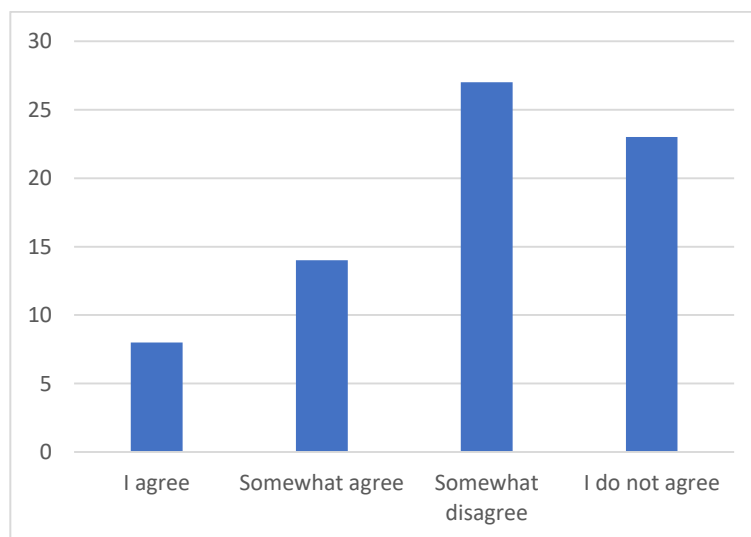


Figure 35 There are facilities for using mobile devices in lecture halls

Regrettably, most surveyed students thought that there was a lack of conditions facilitating blended mobile learning inside lecture halls. They mentioned some examples of facilitating conditions they wished to be provided, such as more wall sockets and free internet.

University Policy on Encouraging the Use of Technology for More Effective Learning

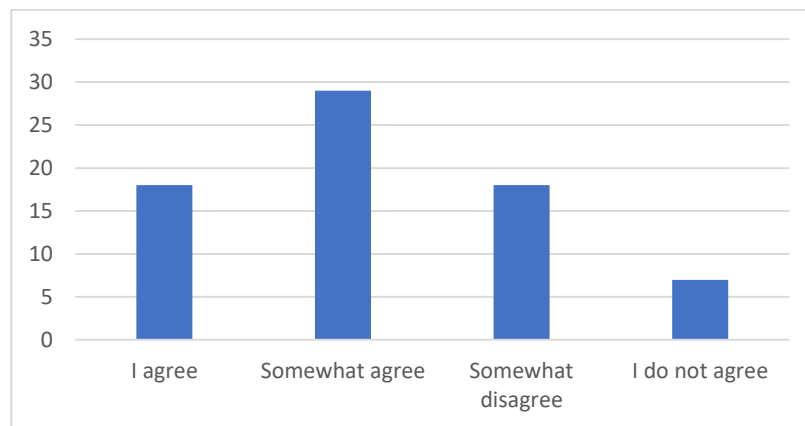


Figure 36 The university encourages students to use new technology

Lastly, the majority of students who participated in the study believed that the university policy encourages the use of technology and mobile devices in particular. For this reason, there were some students that suggested that there should be more facilitating conditions applied in the future to make the adoption of blended mobile learning easier for the students.

Performance Expectancy

The next key factor is the performance expectancy, which refers to the degree to which the students perceive that using blended mobile learning will help them improve their academic performance. In this regard, the data were collected from the participants about their thoughts and beliefs on the role of mobile devices in education and the effect of blended mobile learning in lecture halls, the learning process, their academic achievement, and their motivation.

Important Role of Mobile Devices in Education

The participants were asked whether educators, lecturers, and students would benefit from mobile devices in education; they were also asked how they could do that. Two students thought using mobile devices was not as good as the traditional methods of education. They said they would prefer not to use blended mobile learning as students, because in their opinion, it would not contribute anything considerable to education. Moreover, one of them said that she liked face-to-face (F2F) learning but not distance education using new technology, because she liked direct interactions with lecturers. In fact, she was not aware that this study was focussing on a blend of the two types of

learning: F2F along with mobile learning. However, 70 participants thought that educators, lecturers, and students should benefit from the use of mobile devices. Most of them mentioned various ways of doing it, but a few did not know the exact methods or had no ideas in that moment. In the following table, the most frequently mentioned ways of incorporating blended learning are listed.

Students' thoughts on ways to use mobile devices in education		Number of times mentioned
Use of educational/instructional apps		15
Use of apps for easier, faster, and more enjoyable learning		12
Use of apps for a quick and easy search for the latest information and updates		9
Expansion of ways of improving knowledge and gaining a deeper understanding		8
End to the use of paper and a beginning to the use of soft copies		8
Immediate contact between lecturers and students	Using social media apps	7
	Using email apps	1
Using social media apps to reach all students		2
Using media, videos, and audio–visual material via mobile devices		6
Interactive teaching	This will depend on specific apps.	4
	Where students can choose how to learn	2

Table 8 Students' thoughts about the ways of using mobile devices in education

The participants most commonly mentioned the use of mobile educational apps. To specify, 15 of them said there are too many apps covering all subjects and fields. They thought that the lecturers and educators should utilise mobile apps to improve education. For example, Rawan said,

Mobile devices must be utilised in education. For example, there are so many apps for education. Each lecturer should agree with his students at the beginning of each semester on the apps that fit the course materials and the nature of knowledge. Then, they could use it for better learning, and they could add posts and hold discussions or tests, which will be great in my opinion.

An additional 12 students said mobile devices should be used to provide easier, faster, and more enjoyable learning. For example, Wijdanah said,

I feel bad when I remember we live in the technology era and I am educated with the old teaching ways. I mean, I study physics and the lecturer still teaches students three-dimensional movement with a board and pen. Honestly, I think they did not do their job perfectly, because YouTube contains many videos that explain the concept of dimensions clearly. I do not understand why they do not use technology and still prefer to describe the dimensions on the white board instead of through videos. In addition, they taught students about sound and photonic waves through a black–white picture in a book. I think they should use an app or a video on YouTube, so students can understand better. Unfortunately, only one of the lecturers uses technology—that is, a WhatsApp group—to send videos and colourful pictures. As students, we suggest using technology, but most lecturers refuse to do so. They said they taught their students in the same way they have been taught, which they find clear enough. Therefore, they are not trying to adopt our mobile technology to make education easier and faster. The students try to learn through mobile devices and its technology individually. Nevertheless, if lecturers do use it, that would be much better.

In fact, the opinions of 70 out of the 72 participants surveyed are inclined towards the power of mobile devices to affect education in positive ways. The responses of these questions show the students' irritation at the lack of new technologies in their education, and they blamed their educators and lecturers. This prompted the need to hear the opinions of the lecturers on this matter.

Effect of Blended Mobile Learning on the Lecture Hall

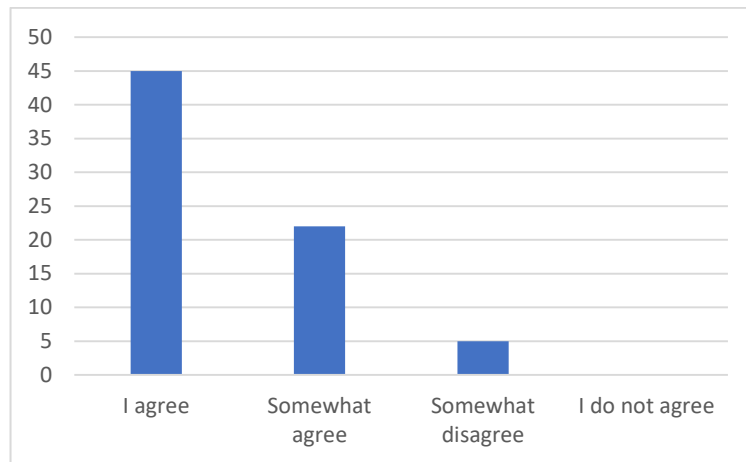


Figure 37 Mobile devices are very useful inside the lecture halls

The students were asked about the importance of using their mobile devices inside the lecture halls. Of these participants, 45 thought it was very important, while 22 said it was somewhat important. However, five respondents thought it was not that important. Then, they were asked about the effect of blended mobile learning on lecture halls. In fact, most responses were positive. They said that it would change lecture halls and make them more flexible, interactive, active, modern, and enjoyable. They added that it would reduce costs and paper usage. In addition, they thought it would extend education beyond the physical lecture hall. However, eight students said that they did not know and three said it would have no effect. Nevertheless, three said it would reduce interactions and two said it would cause distractions.

Effect of Blended Mobile Learning on the Students Collaboration

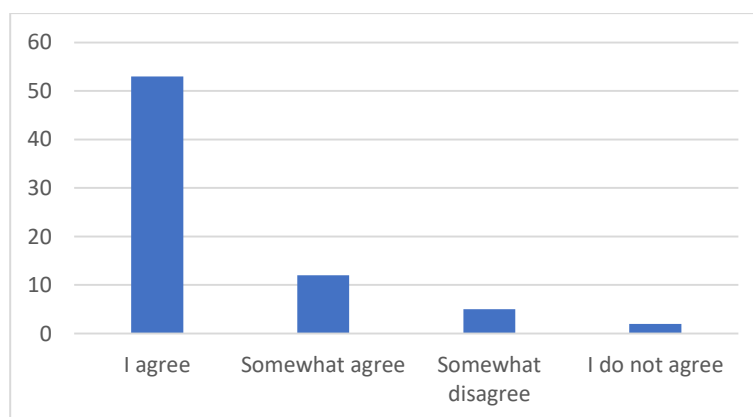


Figure 38 Mobile devices increase student collaboration

The majority of the participants said that the use of mobile devices in a blended mobile learning environment would increase the collaboration between students. They said it would provide easy and fast ways of communicating and sharing course resources.

Effect of Blended Mobile Learning on the Learning Process

The majority of responses mentioned the positive effects of blended mobile learning on the learning process. For example, 16 participants said that it would facilitate the learning process and 12 said that it would improve it. Moreover, seven said that it would make learning more enjoyable, and seven others said that it would make learning modern. While six said that it would make learning fit the demands of the new generation, another six said it would support the learning and educational process. Finally, three said that it would help them to deepen understanding and three said that it would make learning more active.

On the other hand, three participants said that they did not know how blended mobile learning would affect the learning process, and one participant said nothing in response to this question. In addition, three said it would have a negative effect and two were of the opinion that it would distract learners. In another question, 55 of the participating students said that their mobile device is very important for their education and that they use it as a learning tool that greatly helps them. Moreover, 17 of them said that it is somewhat important. Figure 40 below illustrates their responses.

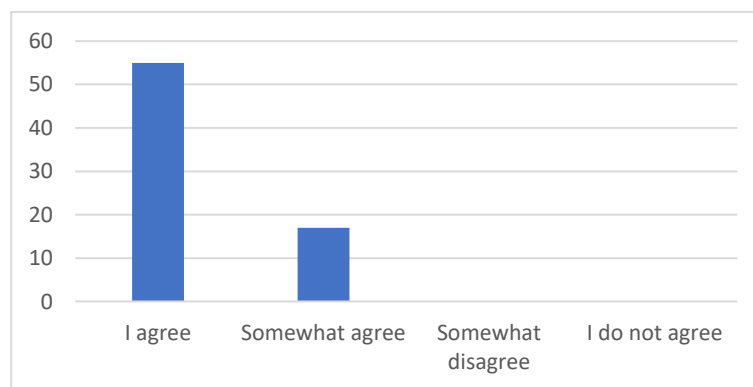


Figure 39 Mobile devices are very important to help me in my studies

Effects of Blended Mobile Learning on Students' Academic Achievement

Effects of Blended Mobile Learning	Number of Students
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Increases students' academic achievement	42 (58.3%)
Not that big an effect	4 (5.6%)
I do not know	13 (18.1%)
Reduces students' academic achievement	5 (6.9%)
It depends on the student's usage	8 (11.1%)

Table 9 Students' responses to questions about the effects of mobile learning on their academic achievement

The majority of the participating students thought that blended mobile learning would increase their academic achievement. While 13 students said that they did not know, four of them did not have any expectations of it making any difference. However, five students thought it would reduce the students' academic achievement. Additionally, eight students said that the effect on academic achievement would depend on how each student could use and benefit from the blended mobile learning.

Effect of Blended Mobile Learning on Students' Motivation

Effects of Blended Mobile Learning	Number of Students
Increases students' motivation	58 (80.5%)
I do not know	7 (9.7%)
None	3 (4.2%)
It depends on the student's usage	2 (2.8%)
Bad effects like wasting time and making the student feel stupid	2 (2.8%)

Table 10 Students' responses to questions about the effects of blended mobile learning on their motivation

The results show that of the 72 participants in this study, 58 students indicated that blended mobile learning would increase their motivation to learn. In addition, seven of them said that they do not know if blended mobile learning would have an effect or not. On the other hand, three students had a different opinion, as they thought there would be no effect on their motivation. Furthermore, two of the participants were indifferent and mentioned the effect would depend on the student's usage. While another two participants suggested using blended mobile learning might have a

negative effect on the learner as it might increase their wasted time. Table 5 shows the students' opinions about the effect of blended mobile learning on the students' motivation to learn.

Effect of Blended Mobile Learning on Students' Creativity

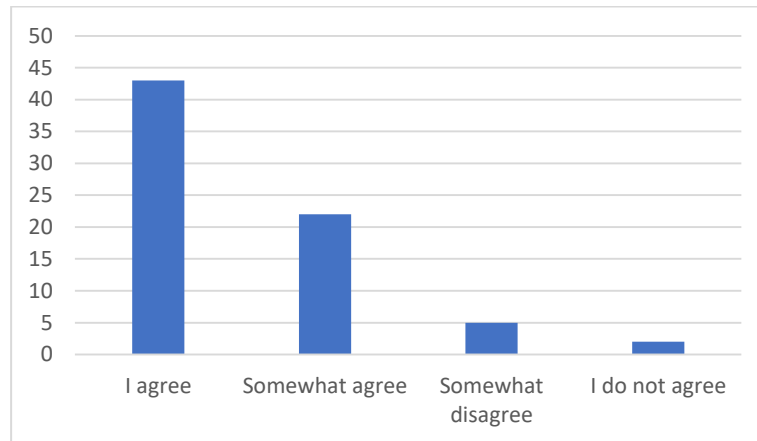


Figure 40 Mobile learning is used to increase students' creativity

Figure 40 above illustrates the opinions of the students about the effect of mobile learning on students' creativity. The results show 43 students agreed their creativity would be positively affected. These included responses such as 'sure', 'yes', 'definitely', or 'of course'. Additionally, 22 participants hesitantly agreed, with responses such as 'possibly yes' or 'maybe yes'. However, five of the students somewhat disagreed and two did not agree and think there is no effect of mobile learning on creativity.

Effect of the Use of Mobile Devices on the Lecturer–Student Communication

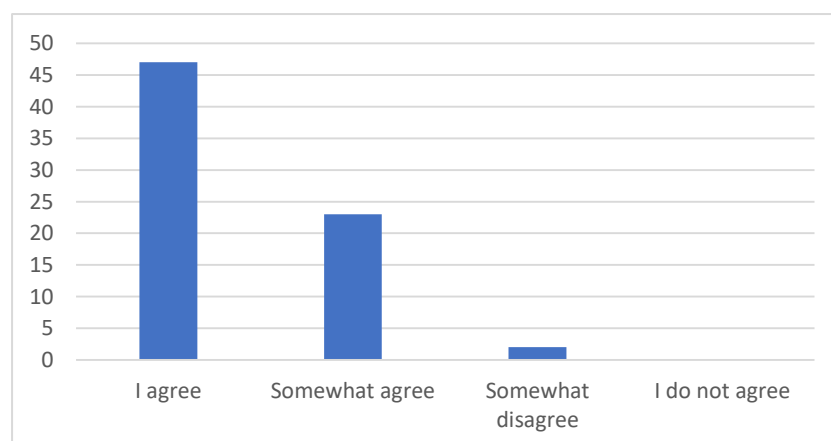


Figure 41 Using social media apps for communication with lecturers brings students closer to their lecturers in a meaningful way

Figure 41 above illustrates the opinions of students about whether or not using social media apps for communication with lecturers would bring them closer in a meaningful way. The results indicate that the majority (47) of the students agreed, while 23 of them said they somewhat agreed. In contrast, two of the participants had said that they somewhat disagreed and that social media apps would not positively affect the communication between the lecturer and student.

Effort expectancy

Another key consideration is effort expectancy, which means the degree of difficulty faced when using blended mobile learning. The participants were asked some questions to evaluate this.

Mobile Devices Make Learning Faster

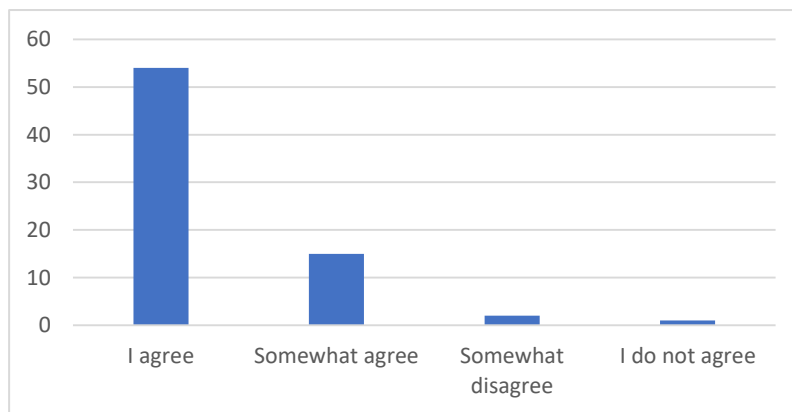


Figure 42 Mobile devices make me learn faster

Figure 42 explains how mobile devices help the participating students to learn faster. The data shows that 54 students agree that mobile devices have a positive effect and help them learn faster, while 15 participants somewhat agree. On the other hand, two of these students somewhat disagree. Finally, no respondents answered that they did not agree to this statement.

Mobile Devices Help Students to Access the Learning Resources

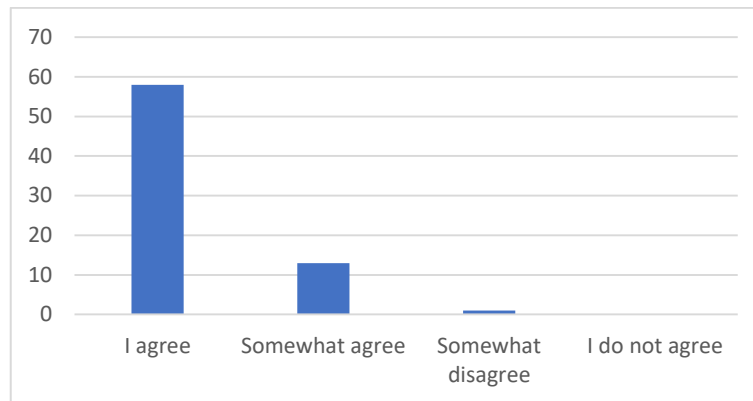


Figure 43 Mobile devices enable students to access a huge amount of data on any subject

The data in Figure 43 above show that a large number of students (50) agreed mobile devices would let them access a large amount of data for any subject, while the remaining participants (13) somewhat agreed or somewhat disagreed. No participants completely disagreed.

Blended Mobile Learning Could Help Solve the Problem of Individual Differences between Students

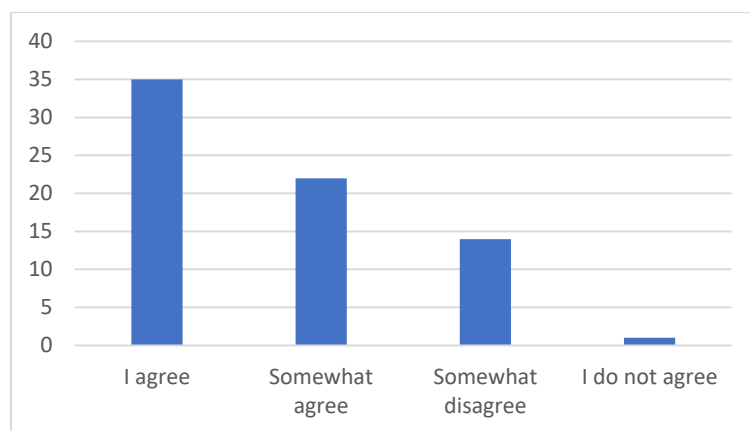


Figure 44 Blended mobile learning helps solve the problem of individual differences between students

As seen in Figure 44, there was a difference in participants' opinions on the extent to which blended mobile learning could help solve the problem of individual differences between students. The results indicated that 35 students agreed it could help in solving this problem, while 22 somewhat agreed, 14 somewhat disagreed, and one did not agree at all.

Habit

This section concerns the participants' prior daily usage habits. Understanding these habits could help lecturers and educators effectively adopt blended mobile learning in higher education.

Duration of Daily Mobile Use

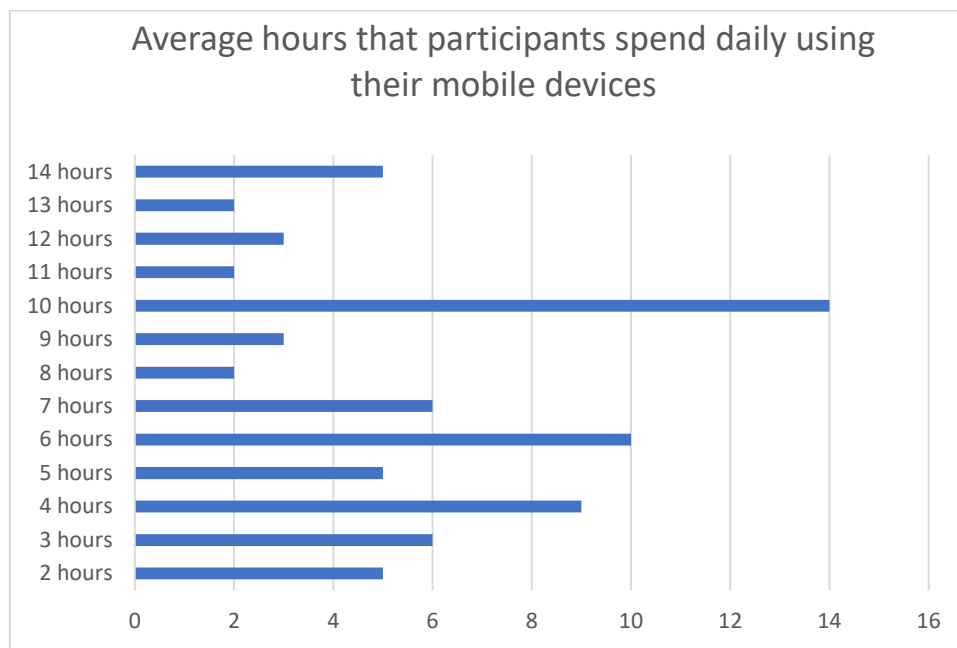


Figure 45 Average no. of hours spent using mobile devices daily

The results show that the lowest average amount of time spent using mobile devices is two hours and the highest is 14 hours daily. However, the highest number of participants said that they use it for 10 hours daily. Peace said,

It hard to say how many hours, but I could say at least 10 hours or more. I check my mobile device every few minutes. I check my social media accounts as well as email, phone calls, or messages. I read PDF papers and books. I spend hours watching videos on YouTube and TED. I even check the time, set the alarm, use the lighter, use the calculator, take photos, and use the timer every day. Moreover, I play music and audio files a lot. My mobile device is the tool that makes my life easier, so I carry it everywhere.

Usually, friends, relatives, colleagues, and neighbourhoods have groups on social media platforms to communicate with each other. Using mobile devices all the time

becomes a habit, even with higher age groups in most societies. This makes me, as an educator, think of the important uses of these new technologies in education.

Mobile Apps Most Commonly Used by Students

WhatsApp	41 (18.7%)
Instagram	29 (13.2%)
Snapchat	35 (15.99)
Twitter	30 (13.7%)
YouTube	16 (7.3%)
Weather	7 (3.2%)
Games	5 (2.3%)
News	6 (2.7%)
Facebook	3 (1.4%)
iBook	4 (1.8%)
Telegram	5 (2.3%)
TED	3 (1.4%)
Translator or language apps	6 (2.7%)
Web browsers	8 (3.6%)
Email apps	6 (2.7%)
Podcasts or SoundCloud	6 (2.7%)
Shopping apps	3 (1.4%)
Blackboard or university LMS	6 (2.7%)

Table 11 Results of the survey on the apps most commonly used by the students

The participants' most preferred mobile apps might ease the implementation of blended mobile learning by allowing the lecturer to decide how to pick the most suitable apps for education. To answer this question, the participants were asked about which apps they used most frequently. All participants indicated that the apps they have used most frequently were social media apps. Of these, 10 of the participants said that they use social media apps without revealing which apps exactly, while the remaining 62 were very specific in naming the apps. For instance, some mentioned only one app they use frequently, while others mentioned a few apps that they spend their time using. The majority said that they often used WhatsApp. This was not surprising, because WhatsApp is considered the most used chatting app in Saudi Arabia. In other questions, the participants were asked whether they use WhatsApp, how often they check it, how often they communicate with it or send media, and whether they are a part of one or more groups on WhatsApp. The result is that 67 respondents said that they open WhatsApp every day. An additional five of them said that they open WhatsApp three to four times per week. Moreover, 57 students said that they have communicated using this app every day, and 15 said that they have done so most days. Moreover, 71 of the participants are members of one or more groups on WhatsApp.

Snapchat took the second place in the list of most used apps, as 35 participants said that they enjoy using it more than the other apps. They answered another question about how often they use Snapchat. The results show that there are 49 participants using this app every day, while 11 use it about three to four times per week. In addition, three participants use it one to two times per week. Nevertheless, three said that they rarely use it and six said that they do not use this app at all. In fact, many people are using Snapchat not for communicating with others but to look at celebrity accounts. For that reason, the participants were asked if they share videos or photos with their followers, to which the majority of them responded that they do. A total of 40 participants said that they have shared media with others every day; 15 said they do this most days; nine said that they rarely do; and eight said that they never shared media with others through their Snapchat accounts. When asked if they have been members of any groups on Snapchat, 43 participants responded that they had joined groups.

In addition, six participants indicated that they use email apps frequently. However, most of the participants responded, when asked other questions, that they preferred to use their mobile devices more than PCs or laptops for their emails, as Figure 47 illustrates.

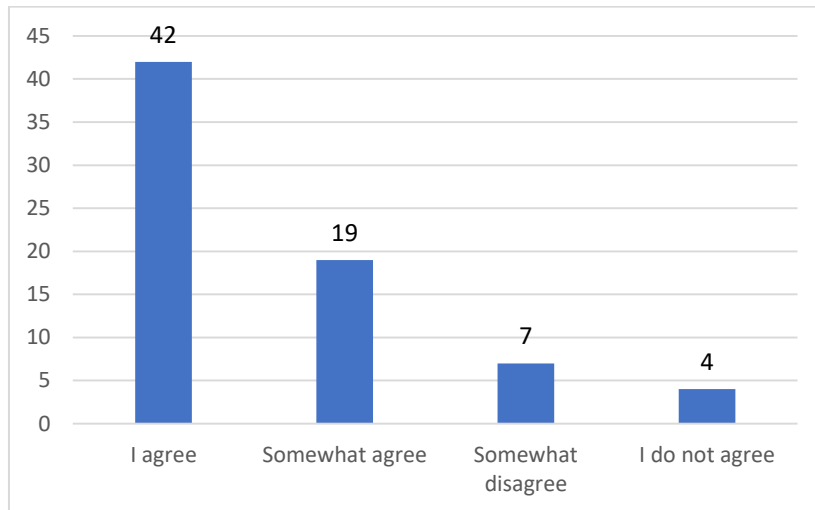


Figure 46 If I want to use e-mail, I prefer to use a mobile device rather than a computer

Students Using Mobile Devices to Learn Something of Personal Interest

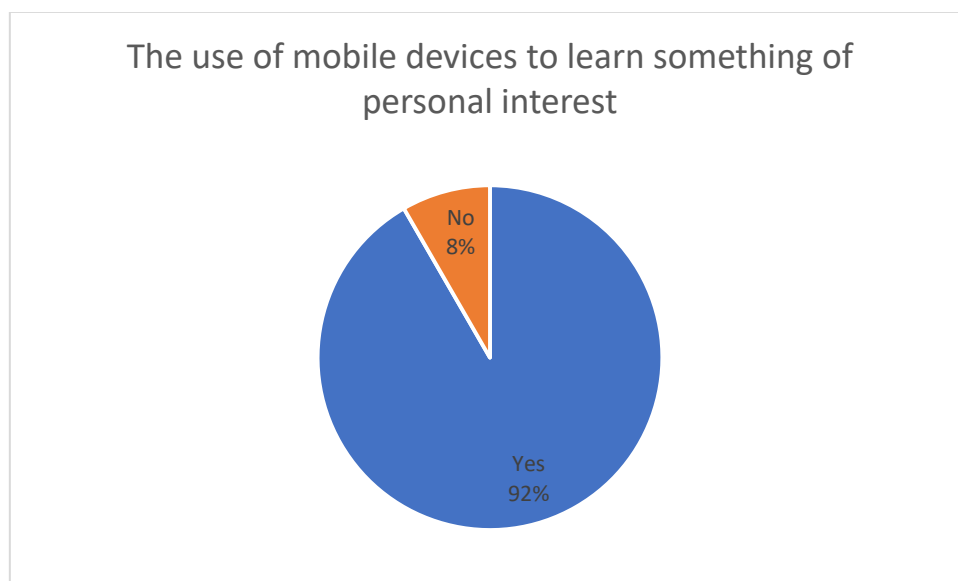


Figure 47 Students using mobile devices to research a topic of personal interest

The participants were asked if they used their mobile devices to learn something in which they were personally interested that was not related to their studies. Of the 72 participants, 66 of them said yes and 16 said no. Most of the participants who answered affirmatively gave one or more examples of subjects that they had learned

about using their mobile devices. The following table shows the most mentioned subject that the participants were concerned with.

Subject	Number of participants
Foreign languages	17 (18.3%)
Cooking	11 (11.8%)
Designing/editing photos/videos	8 (8.6%)
Books/reading skills	7 (7.5%)
Sports/physical exercise	6 (6.5%)
Fashion/make-up	6 (6.5%)
Education/research skills	6 (6.5%)
Self-development	5 (5.4%)
Religions/cultures	4 (4.3%)
Games	4 (4.3%)
E-commerce/e-shopping	3 (3.1%)
Drawing/painting	3 (3.1%)
History	3 (3.1%)
Programming languages	2 (2.2%)
Body language	2 (2.2%)
Decoration/furniture	2 (2.2%)
Communication skills	2 (2.2%)
Computer skills	2 (2.2%)

Table 12 Data on subjects of personal interest searched for using mobile devices

From the data collected from the students surveyed, foreign languages were the most frequently searched subject on mobile devices for learning. Of the 17 participants who responded that they were learning languages by using some apps, watching videos, listening to podcasts, or reading e-books, 10 of them mentioned that they specifically learned English using their devices. The second most frequently searched subject was cooking, as 11 participants said. These students follow famous chefs on social media and YouTube, and some of them have cooking and recipe apps. However, seven participants were interested in designing and editing photos, and one was interested in designing videos. An additional seven said that they learned about reading and books, while three answered that they had learned about reading skills.

Further, the rest mentioned that they learned reading or learned about books, without explaining whether they learned the skills or something special related to books.

Some topics of learning were mentioned by only one participant. For example, these participants had learned about subjects such as planning events, nutrition, medicine and health, politics, photography and cameras, environments and nature, chess, mathematics, philosophy, psychology, poetry, and human resources.

Educational Experiences

Students Using Mobile Devices for Academic Purposes

One of the open-ended survey questions was about using mobile devices for academic purposes. The results show that two participants said that they had never used it for that purpose, while the remaining participants said they had. Moreover, some students were not specific in explaining the academic activities for which they used their mobile devices. For example, Salem said, 'Yes, I depend on my mobile device for most of my studying and learning.' Some participants also named some apps where they could find some lessons such as YouTube, Instagram, and Twitter. They said that they use their mobile devices to do run some searches, download books, use the Blackboard app, take pictures of other students' or their lecturer's notes on the white board, or share resources and communicate with other students or lecturers.

First, the results of this survey show a high level of mobile device use for learning and developing a better understanding of academic material to support their studies. While 10 participants said that they had learned things related to their studies by using their mobile devices without explaining which tools they had used, 29 participants specified that they used their mobile devices to search for data, information, photos, or videos to help them better understand their study material. YouTube was named by participants six times as the app that works as a helpful channel with supplementary lessons, while four said that they learned by downloading and reading PDF books and audio books. An additional five participants use mobile devices to develop their English language skills, specifically by downloading teaching apps and communicating with native speakers. For example, Bassam, who is studying in the English department, said that he practices English on many apps, where he can easily communicate with

native speakers; this helped him to improve his English language skills and gave him more confidence. Moreover, there were five participants that said that they use their devices for translating new words. In addition, four of them said that they have benefitted from this new technology by becoming members in virtual study rooms or groups, which can be joined through some apps like WhatsApp.

Second, some participants have completed some of their studying tasks using their mobile devices. For example, 12 participants said that they did their research using their mobile devices, five said they have created presentations, and other two created surveys. Furthermore, four participants said that they had submitted assignments using mobile devices. For example, Rawan said that she had used her mobile device to read books; prepare some assignments, tasks, and projects; design and edit images and videos; check her email; take courses via mobile apps; and follow some academics on social media apps.

Third, participants listed the use of mobile tools or apps to facilitate their studying. For example, 12 participants said that they used their devices for communicating with their peers or lecturers, while eight participants mainly depended on email apps to check their emails. There were also four participants who used their mobile devices to take photos; three who used them to record lectures; two who used them to write notes; and another two who used them to download lecture slides. For example, Raeid said that he used the Liquid Text app to download the lectures and slides and to add his comments. In addition, five participants said that they used the Blackboard app, and three said that they checked their timetables and grades using the university app.

Students' Previous Experiences with Using Mobile Devices in the Classroom for Educational Purposes

The participants were asked if they had previous experiences with using mobile devices inside classrooms. The results showed that 43 of them had used their mobile phones or iPads in classrooms. Even though nine of them did not explain specifically what activities they had done with their devices, they said that using mobile technology in classrooms, in particular, made their tasks easier, reduced their time, effort and paper usage, or decreased the weight they needed to carry to class. Other participants were more specific in describing the activities for which they used their mobile devices. For example, 13 participants said that they used them to look at lecture slides. Abu

Hatem said, 'For me, reading electronic fonts is easier than reading handwriting and following the slides on my device is easier than doing so on the projector or through data show, especially if I sit in the last row.'

Of the remaining mobile device activities, taking pictures of the blackboard was the second most frequent activity done by the students. An additional four participants said that they had run quick searches for new information; three said they had used translation apps inside classrooms; another three said that they shared photos or videos with others; and another three looked at and shared e-books or PDFs. Additionally, two students said that they had written notes on their mobile devices; two said they had used the calculator app; and two female participants said that they had communicated with their male lecturers when there were technical issues with the microphone or speakers, because they were usually not in the same place. Other activities were mentioned by single participants (these were unique responses), such as recording, using the Blackboard app, or using specific apps. For example, 'We used the Kahoot application under the supervision of the lecturer. It was very enjoyable as we, as students, were able to evaluate each other. We have benefitted from and enjoyed a new technical learning method by using just our mobile phones.'

Furthermore, 29 participants said that they had no experience using their mobile devices inside the classroom. While most of them did not mention the reasons, some blamed the lecturers for this. For example, Wissam said, 'No, unfortunately, the lecturers do not allow students to use their mobiles.' In addition, Wijdanah said,

No, I have not had a chance yet. I remember one day a lecturer needed some information, but she did not have internet connection at that time, so she has asked some students who had internet to search for it. On another day, I asked the lecturer to follow the lecture with the documents and slides on the blackboard, but she rejected this idea and said she did not trust students and were afraid they would open other apps.

Having a large number of students who cannot take advantage of their mobile devices is a surprise in the age of technology. When we talk about college students, they certainly use their mobile devices very often. As described above, students responded that they use their mobile devices for up to 14 hours daily. In addition, all participants

thought that it would be important to use mobile technology inside the classroom, as they find it useful and easy and believe it will reduce the time and effort they spend on schoolwork. Once again, several students mentioned the main cause preventing them from using mobile technology was their lecturers. For that reason, it was necessary to hear from the lecturers as well. Thus, another open-ended survey was designed to gather the opinions of lecturers on mobile devices being used in the classroom, which will be discussed in Chapter Seven.

Students’ Opinions and Experiences with Contacting Lecturers and Peers Using Mobile Devices and Apps

Mobile app	Number of students
WhatsApp	42 (46.7%)
Email	26 (28.9%)
Twitter	11 (12.2%)
Phone calls	5 (5.5%)
Blackboard	2 (2.2%)
Wikis	1 (1.1%)
Skype	1 (1.1%)
Telegram	1 (1.1%)
Facebook	1 (1.1%)

Table 13 Data on the students’ preferred apps for contacting their tutors and peers

When asked whether they have communicated with their lecturers via mobile apps, the majority of students surveyed (71) responded affirmatively. Some students said that they had contacted their lecturers by email, Blackboard, Skype, or social media apps such as WhatsApp, Twitter, Wiki, Telegram, and Facebook. However, seven students did not indicate which apps they had used. Moreover, the participants said that their reason for contacting the lecturers were to ask questions, send assignments and projects, confirm some information, hold discussions, stay updated with the latest course announcements, acquire permission to be absent from lectures, solve study problems, or receive course grades. The students usually did this via app groups and found it to be a useful method to support their learning.

Social Influence

The majority of the participating students said that they are active on social media because of their friends, colleagues, and relatives. Most of them had joined one or more groups on social media apps. Each respondent said that everyone they knew was using mobile devices for communicating and sharing information, tips, news, and entertainment media.

Academic Social Influence

The participants emphasised the importance of having a mobile device with popular social media apps for their study. They said that it provided a fast and simple way to communicate and share study resources and lecture notes. Each participant said that they had joined one or more groups for each course. In addition, they used groups to coordinate for group projects in their classes.

Behavioural Intention

The following results concern the students' behavioural intention. In this regard, the participants were asked to describe their feelings about using their own mobile devices for their education. The results showed overall positive attitudes of the students to adopt blended mobile learning in higher education.

Students' Skills of Using Mobile Devices in Education

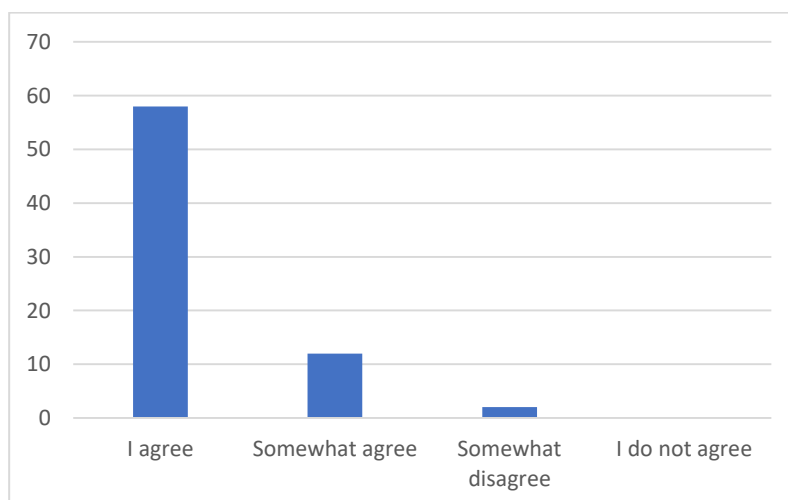


Figure 48 I have the skills to use my mobile device for education

First, the students were asked about their skills. Most participants said that they had the skills to use their mobile devices in a blended mobile learning environment, while a few of them said that they somewhat had the skills, and two said that they were not sure and may need to develop more skills.

Students' Feelings about Using Their Own Mobile Devices for Learning with the Guidance of a Teacher/Lecturer

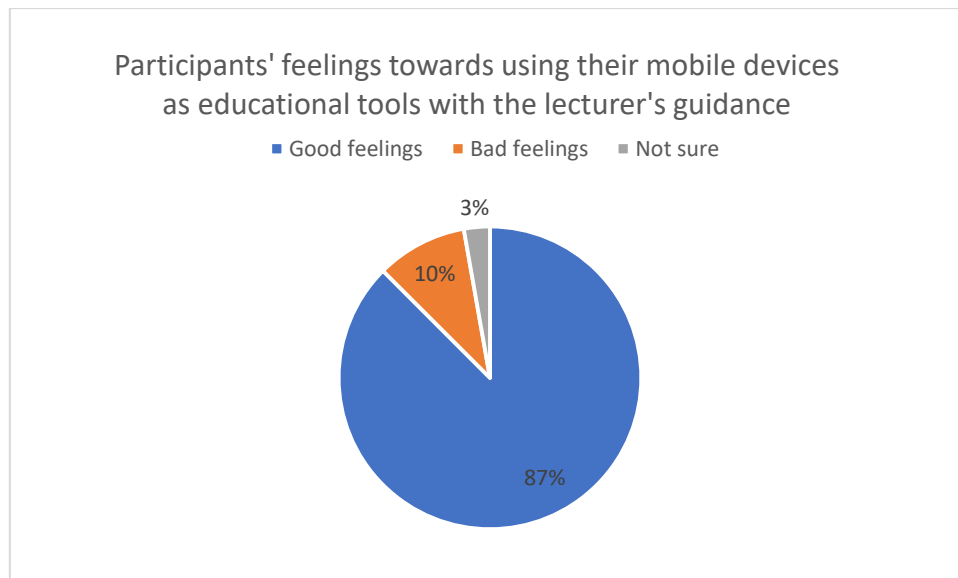


Figure 49 participants' feelings about using mobile devices for academic purposes with the instructor's guidance

Most respondents gave positive feedback about using their mobile devices under the supervision of their lecturers, with 63 participants agreeing to it with positive comments, saying it is important, necessary, excellent, wonderful, good, nice, useful, and that they would be grateful to use it. For example, Peace said, 'That would be great. The learning process will be active and will help with deeper understanding.' However, two students' opinions were neutral, neither in agreement nor in disagreement with using mobile devices under the lecturer's guidance. The neutral parties said that they did not know what to think, because they had not previously used it as an educational tool. On the other hand, seven participants said that they did not see it as a good idea or that they were reluctant. Of those seven, two participants said that they had never used mobile devices as an educational tool before. Therefore, they felt negatively towards the idea, and three said that mobile devices were a distraction for students and thought it did not work as an educational tool. For example, Admin said,

Use it as a main tool? No! I did not feel good about it, because it would distract the student from giving full attention to the lecture. In addition, I think one of the educational institute's advantages is that it is the place where students are away from electronic devices, where they can relax their eyes from staring at mobile screens.

One of these students responding negatively said that he preferred to read from papers rather than from mobile devices, while the last student did not explain why they were negative about the use of mobile technology under the lecturers' guide.

In fact, most of participants who had negative feelings about it had no previous experience with using their devices inside classrooms. However, two of them had used them for taking photos and using the calculator app, although this was without the lecturer's instructions or guidance. In other words, the students may need to experiment with using mobile technology before forming opinions about it. For example, the participants who preferred reading from paper thought that mobile devices were not a tool for reading books. Nevertheless, if they could look at its advantages, they may have other feelings or opinions. However, this type of change of opinion after experiences could possibly be seen on both sides.

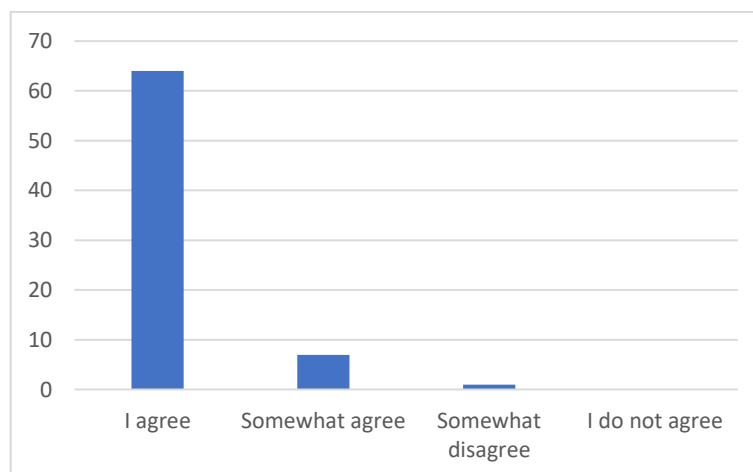


Figure 50 I like the use of mobile devices in education

In fact, as the figure above shows, most of the participants like to use their mobile devices in their educational environment. For example, they said they use it to search for information and share course materials. Most of them kept course materials stored in their mobile devices, as shown in Figure 52 below.

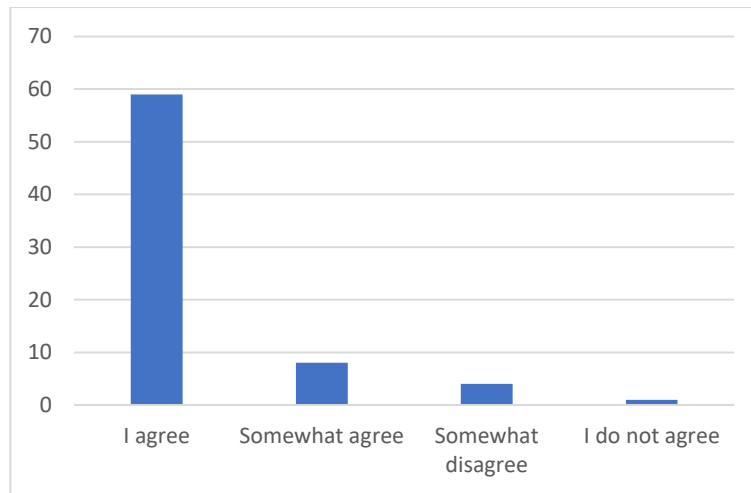


Figure 51 I keep some study materials in my mobile device

Students' Feelings About Downloading Apps to Support Their Education

When asked how students felt about downloading apps to support their education, one of the participants stated, 'I do not know.' Further, four participants said that they had negative feelings. However, 67 participants had positive feelings and mentioned some applications that they thought would be helpful in supporting their education. For example, Jas said, 'I am grateful for many mobile apps that have helped me effectively—for example, YouTube, Grammarly, Google Translate, Pinterest, Telegram, iFiles, Facebook, Picsart, and iMovie.'

In addition, other participants mentioned other apps such as WhatsApp, YouTube, Twitter, Telegram, Blackboard, Hangouts, TED, iTranslate, Zoom, Dropbox, Photomath, and an online dictionary application.

5- Important Features of Mobile Devices to Suit Blended Mobile Learning

While seven participants did not know what important features mobile devices should have to suit blended mobile learning, 65 participants mentioned one or more features. A good internet connection was the most mentioned feature, as 21 participants talked about it as their response. An additional eight participants said that mobile devices should have good apps made specifically for education. Other six participants said they should have features controllable by the lecturer, and five talked about the importance of providing large batteries and power banks. Moreover, some features

were mentioned, such as high processing power, large screens, large memory, and good user skills.

It was surprising that some of the students felt it was important for their lecturer to control their use of mobile devices. They believed that mobile devices would negatively affect education, unless the lecturers could control how students used them. This trains the students in higher education on how to effectively use the new technology, especially mobile devices, which is very important.

6- Barriers to Adopting Blended Mobile Learning

Most significant barrier	Number of students
Students' improper use	4 (5.5%)
Lecturers	15 (20.8%)
High costs of mobile devices	10 (13.9%)
Less awareness of this subject from both students and lecturers	5 (6.9%)
Unavailability of internet on mobile devices	16 (22.2%)
Damage to mobile devices	1 (1.4%)
There are no barriers at all	3 (4.2%)
No previous experiences from both students and lecturers	4 (5.5%)
I do not know, or I have no idea	14 (19.4%)

Table 14 Students' responses to the question about the barriers to adopting mobile learning

Table 9 above shows the participants' thoughts about the barriers they faced while trying to adopt blended mobile learning. While three of them said that there were no barriers, 14 of them said they did not know and 53 of them spoke about one or more barriers. First, 16 of them listed the lack of an internet connection as the largest barrier. Second, 15 accused their lecturers for being a barrier that prevented their adoption of blended mobile learning; they made comments like these: 'The lecturers preferred the traditional ways of teaching', 'The lecturers are resistant to change', and 'The lecturers reject mobile devices.' Third, 10 participants listed the high financial cost of mobile devices and commented the following: 'Its maintenance is expensive' and 'New devices appear repeatedly that make the current one old so fast.' Fourth, five of the participants said that the lack of information and awareness about blended mobile learning could be a barrier. Lastly, four of them indicated that the lack of experience of both lecturers and students using mobile devices in education could be a barrier.

Summary

The findings indicate that the students are drawn to blended mobile learning. The majority agreed on the importance of using mobile devices as educational tools in a blended learning environment. Many of the participating students had some understanding of mobile learning, but a few had an understanding of blended learning.

Thus, a few had an understanding of blended mobile learning. Most of them believed that blended mobile learning makes education easier and faster. In addition, it increases student collaboration, motivation for learning and academic achievement. The participants stated that the lack of internet access faced by students and their lecturers' resistance to change are the biggest barriers to adopting blended mobile learning.

Chapter Seven: Data from the Lecturers' Open-Ended Survey

Introduction

An open-ended survey was conducted with lecturers from April 2018 to November 2018. The survey took 30–45 minutes to be completed. The need for lecturers' opinion came from students' interviews and open-ended surveys. The students stated the lecturers were one of the barriers to the implementation of blended mobile learning. In this study, all university teachers are called lecturers.

1- Lecturers' Profiles

Academic Qualifications and Current Professional Experience

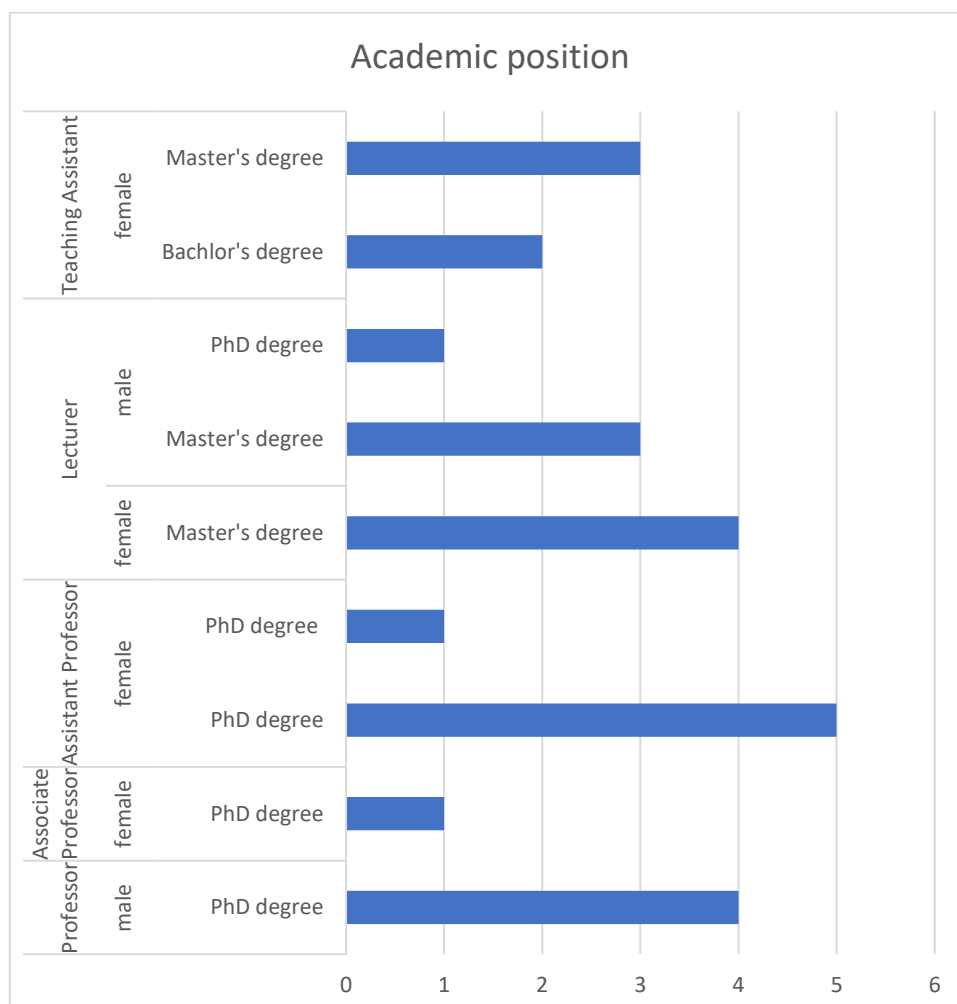


Figure 52 Academic level attained by and current professional position of lecturers

The academic ranks in Saudi universities from highest to lowest are as follows: professor, associate professor, assistant professor, lecturer, and teaching assistant.

While the professor, associate professor, and assistant professor must have a PhD, the lecturer must have a master's degree and the teaching assistant must have at least a bachelor's degree. In this study, participants included four professors, one associate professor, one assistant professor, eight lecturers, and five teaching assistants.

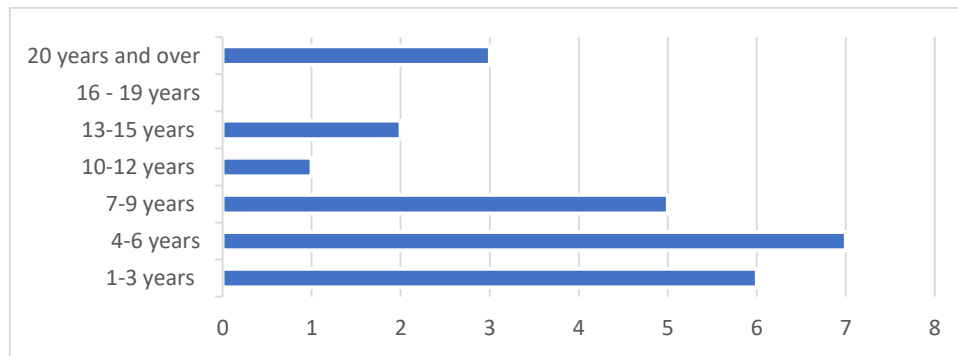


Figure 53 Lecturers' teaching experience by the number of years

All participants had teaching experience of more than one year. The results also show that there were six participants who had teaching experience of 1–3 years, seven who had 4–6 years, five who had 7–9 years, one who had 10–12 years, two who had 13–15 years, and three who had more than 20 years of teaching experience within higher education.

2- Lecturers' Perceptions

Lecturer's Understanding of the Term, 'Mobile Learning'

The term 'mobile technology' was familiar to most participants. First, 13 participants thought that mobile learning referred to the use of mobile devices for learning. For example, Mohammed Suleiman, a lecturer belonging to the religion department said, 'Mobile learning is the use of mobile technology and mobile devices, such as PDAs, mobile phones, tablets, and palm devices, for an educational purpose.' In addition, Batool, a lecturer of information technology, said, 'Mobile learning is using smart phones to complete the learning process anywhere, anytime.' Second, three participants said that mobile learning means the use of mobile devices as a teaching tool. Furthermore, one participant said that mobile learning is the ability to learn anywhere. One said that mobile learning involved learning online without needing to attend in-person classes, unlike one participant who thought that mobile learning is

the use of mobile technologies inside a classroom. However, one lecturer said that mobile learning is the information coming from students' predictions. Finally, four participants said that they did not know the meaning of mobile learning.

Lecturers' Understanding of the Term 'Blended Learning'

The lecturers participating were also asked a question about what they knew and understood about blended learning. The responses show different understandings of blended learning. First, most participants (12) had a clear idea about blended learning as a blend of traditional learning and electronic learning (e-learning). For example, Lecturer A said, 'Blended learning is one of the education systems in which e-learning is integrated with traditional learning in a single framework.' Additionally, Batool said, 'It uses the traditional educational method in a physical classroom and integrates e-learning, where one complements the other in many ways.' Second, three participants thought that blended learning is the combination of old and new technologies in education. For example, Haifa said, 'Blended learning combines old teaching methods and technologies with new technologies.' Third, two participants said that it is the use of mobile learning and traditional learning together. Fourth, one participant said that it is the use of new technology in education. Fifth, one participant said that it is the use of electronic devices in education. Lastly, five participants said that they did not know what blended learning was.

In fact, their understanding of blended learning is a reflection on the lecturers' intentions to learn new teaching methods and their interest in keeping up with modern developments in teaching and education.

Lecturers' Understanding of the Term 'Mobile Blended Learning'

While seven of the participants had no idea about blended mobile learning, 17 said that they understood what this term meant. First, 14 participants said that blended mobile learning is the combining of traditional education with mobile learning. For example, Albetul said, 'I think it is the education that combines together traditional education in the classroom with mobile learning.' Moreover, Maysun said 'As I understand it, it is the integration of the use of mobile devices in traditional education either as an essential method of learning or as a tool for supporting education.' Additionally, Mai was able to infer the meaning, as she said, 'I guess blended mobile

learning is the use of new technology of mobile devices integrated into traditional formal education.’ Second, three participants had a different understanding of blended mobile learning, with these responses: ‘It means educating students in classrooms through books and computers’, ‘using mobile devices in teaching’, and ‘education where it is easy to get information at any time via electronic devices.’

The lecturers’ understanding of blended mobile learning is an indication of their knowledge of new teaching methods, although there were several lecturers who could infer the meaning of blended learning and mobile learning. However, some spoke about the use of smartphones in traditional education instead of saying mobile devices, which shows that the most popular mobile devices are smartphones.

3- Lecturers’ Confidence in Using Mobile Devices for Learning

All participants said that they have confidence and enough skills to use their mobile devices successfully for teaching.

4- Lecturers’ Acceptance of Blended Mobile Learning

This section illustrates the factors from the unified theory of acceptance and use of technology (UTAUT) that influence the acceptance of blended mobile learning in Saudi Arabia’s higher education.

Facilitating Conditions

The first key factor to consider is facilitating conditions, which is investigated by asking the participants about their ability to connect to the internet as well as about their mobile device ownership.

Access to the Internet

All lecturers have access to the internet most of the time. The university provides free internet to lecturers. However, some participants prefer to use their own internet connection. On the other hand, all of them said that they have the ability to download apps on their mobile devices.

Lecturers' Ownership of Mobile Devices

Type of mobile device	Number of participants
iPhone	12 (36.4%)
iPad	7 (21.2%)
Samsung Galaxy	5 (15.1%)
Smartphones	4 (12.1%)
Tablet	2 (6.1%)
Huawei	2 (6.1%)
Lenovo	1 (3.0%)

Table 15 Main types of mobile device owned by the lecturers

All participants own at least one mobile device and all participants own smartphones. While four were not specific about the type of their mobile phones and said they had smartphones, 12 said they had iPhones, five had Samsung Galaxy phones, two had Huawei phones, and one had a Lenovo phone. In addition to mobile phones, seven participants said that they also had iPads and two said that they had tablets without naming them.

Academic Facilitating Conditions

To investigate this factor, the lecturers were asked about their opinions on mobile learning implementation at their university.

The University Encourages Lecturers to Use Modern Technology

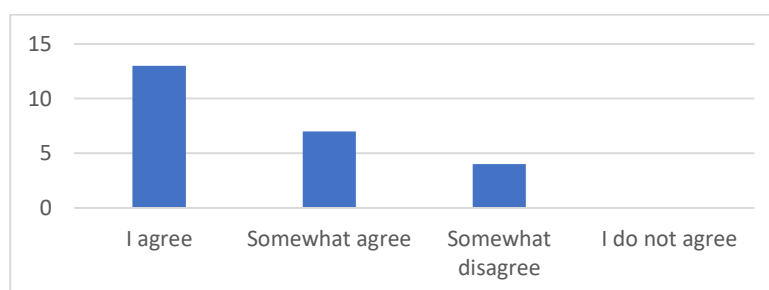


Figure 54 Lecturer's responses to statements about the university's encouragement of technology use

A majority of the participating lecturers said the university encourages the use of modern technology. Some of them said that they had attended a conference at Qassim University about blended learning. In fact, 20 lecturers agreed that the

university encourages the use of modern technology, while four of them somewhat disagreed.

There Are Facilities for Mobile Devices to Be Used in Lecture Halls

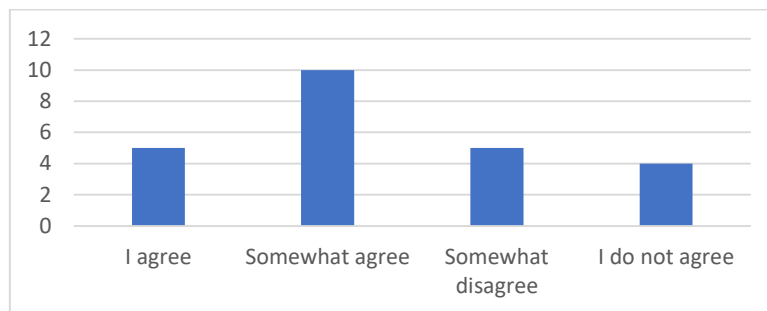


Figure 55 Lecturers' responses to statements about the facilities for mobile devices to be used in lecture halls

As Figure 55 above shows, there were 15 participants who said that the lecture halls are suitable to use mobile devices in a blended mobile learning environment. However, nine of them thought that more facilities need to be created.

Students Are Encouraged to Use Their Mobile Devices for Learning in Lecture Halls

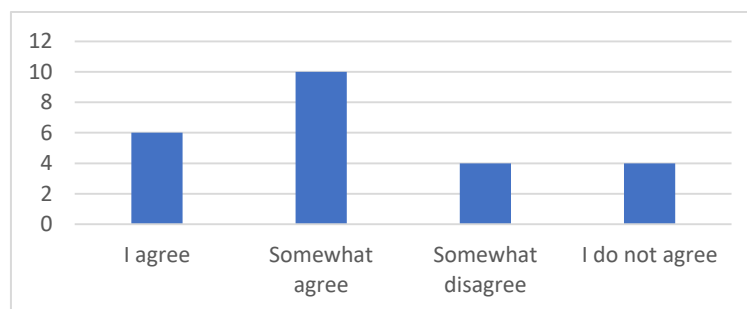


Figure 56 Lecturers' responses to statements about the students were encouraged to use their mobile devices for learning purposes

The participants gave varying opinions concerning the students' encouragement to use mobile devices inside lecture halls for education and learning. While 16 said that they agreed or somewhat agreed, eight of them somewhat disagreed or totally disagreed. In fact, the adoption of mobile devices should be done by the lecturers, and these results show that not all lecturers encouraged students to use their mobile devices.

Performance Expectancy

The next key factor is the performance expectancy. The next paragraphs concern the results of the expected effects of blended mobile learning on lecture halls, students' academic achievement, and students' motivation.

Effects of Blended Mobile Learning on the Lecture Hall

The results show that three participants said they were not sure how blended mobile learning could change lecture halls and one participant said that blended mobile learning could reduce the interaction inside lecture halls. On the other hand 20 participants said blended mobile learning would change lecture halls in positive ways. Specifically, six participants said it would make lecture halls modern and suit the students who live in this technological era. In addition, four participants said it could be a more effective learning environment and increase student interaction. Furthermore, three said that it would make lecture halls more active and lively. They have said that it would be more comfortable, easier, and less expensive.

Effects of Blended Mobile Learning on Students' Academic Achievements

Effects of blended mobile learning	Number of students
Increase in students' academic achievement	18 (75.0%)
I do not know	4 (16.7%)
It depends on the student's usage	2 (8.3%)

Table 16 Participants' responses to statements about the effect of blended mobile learning on the students' academic achievement

Table 16 above illustrates that the majority of participants (18) thought that blended mobile learning would increase students' academic achievement. However, some of the participants emphasised on the importance of the proper use of mobile devices. While four of them said they have no idea or they did not know, another two said that it depends on how each student uses their mobile device in a blended mobile learning environment.

Effects of Blended Mobile Learning on Students' Motivation

Effects of blended mobile learning	Number of students
Increases students' motivation	23 (95.8%)
It depends on students' usage	1(4.2%)

Table 17 Effects of mobile learning on students' motivation

The participants' responses were very similar, as most of them (23) said that blended mobile learning would increase students' motivation. However, one participant had a different opinion, as he said that the effect would depend on students' usage.

Effect of Blended Mobile Learning on Helping Individual Differences Between Students and Increasing Students' Creativity

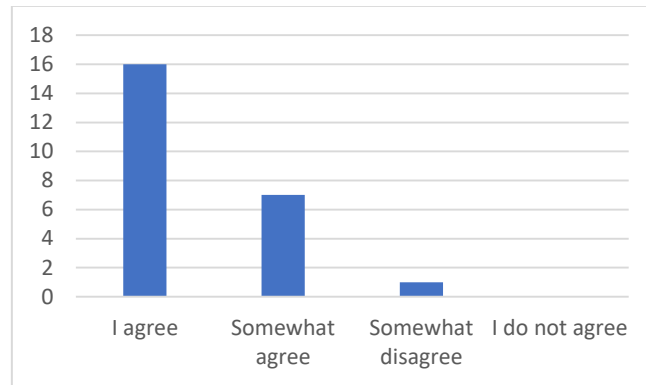


Figure 57 Blended mobile learning helps solve individual differences amongst students

Figure 57 above describes the participants' opinions on the effect of blended mobile learning on solving individual differences amongst students. A majority of the participants (16) totally agreed, and seven participants somewhat agreed that the blended mobile learning could help to solve this problem. However, one of them somewhat disagreed.

In another question, most of the participants (14) agreed that blended mobile learning would increase students' creativity, while another eight said that they somewhat agreed and two of them somewhat disagreed. The following figure (Figure 58) demonstrates this result.

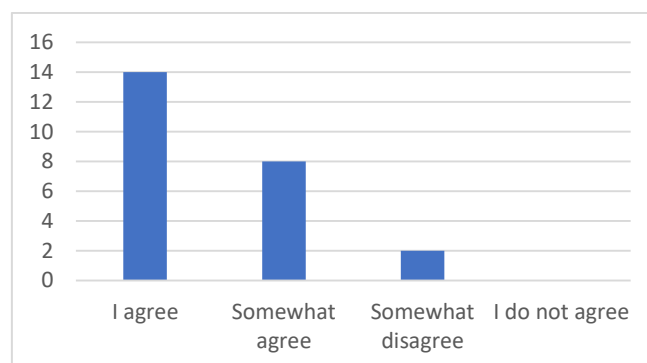


Figure 58 Blended mobile learning would increase students' creativity

Effect of Blended Mobile Learning on Ease of Access to Data

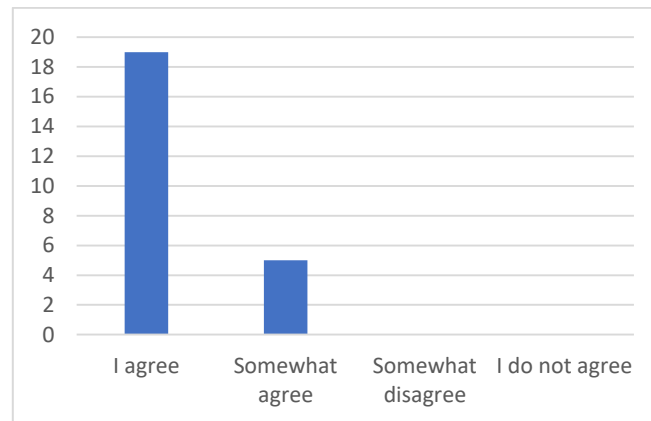


Figure 59 Blended mobile learning enables the user to access a huge amount of data on many subjects

The participating lecturers all agreed (19) or somewhat agreed (5) that blended mobile learning would enable the user, especially students, to access a huge amount of data on any educational subject. They were aware that mobile devices allow students to reach unlimited information and media, which could positively affect their education.

Use of social media apps to share the lecture with students

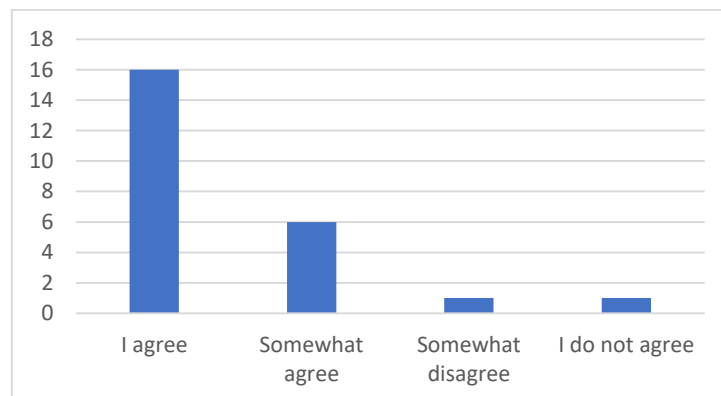


Figure 60 Using social networking apps to share the lecture with the students in a meaningful way

As Figure 60 above shows, most of the participants agreed or somewhat agreed that social media apps could be used to share the lecture with students in a meaningful way. However, two participants did not agree that social media apps could do that.

Effort Expectancy

Effects of Blended Mobile Learning on the Learning Process

All participants thought that blended mobile learning would affect the learning process in positive ways. They thought that the learning process could be easier, more modern, interesting, and fun. They mentioned the power of the internet to provide unlimited

data and the power of mobile devices to make learning happen anywhere and anytime. They also indicated that blended mobile learning would reduce time and effort. They said it could blend the two types of education to suit students' expectations of modern education via new mobile technology and traditional education and direct interaction between lecturers and students.

Effects of Blended Mobile Learning on Teaching Methods

One participant found the question of how blended mobile learning affects teaching methods to be difficult to answer, and two said that they were not sure. Moreover, one participant said that blended learning would make current teaching methods outdated. However, two said that it would affect learning both in positive and negative ways. On the other hand, most of them said that it would change teaching methods in positive ways. Some said that it would provide variety in teaching methods to suit students' needs. Others said that teaching methods would be more modern and convenient in today's technological era, with the explosion of information.

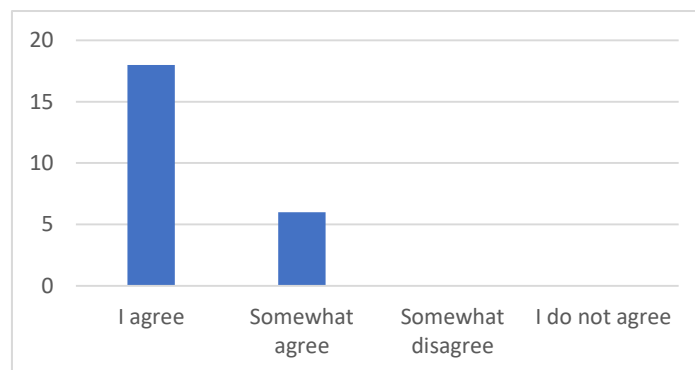


Figure 61 Blended mobile learning will make students learning faster

Habit

Total Time Spent and Duration of Mobile Use Daily

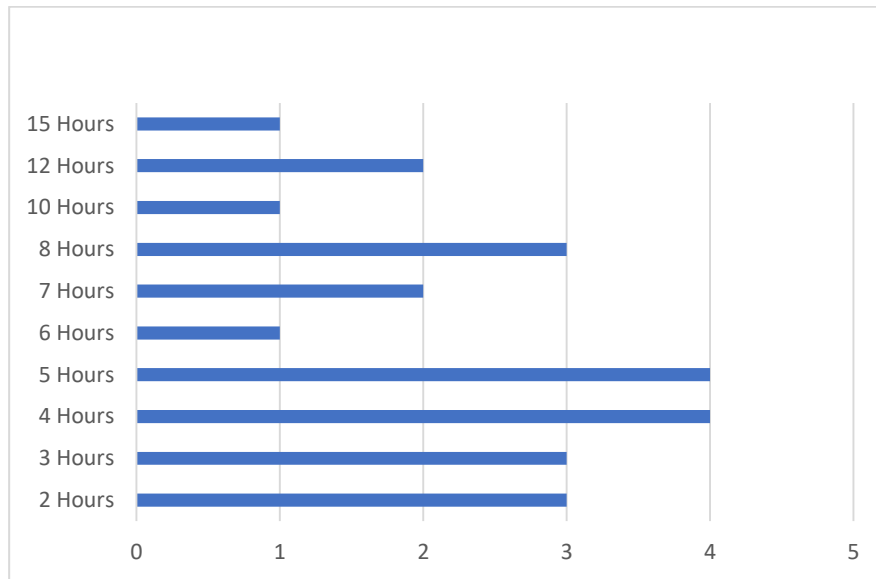


Figure 62 Average number of hours spent daily by lecturers, using their mobile devices

The results show the lowest amount of time spent using mobile devices is two hours daily and the highest is 15 hours daily. However, the highest number of participants said that they use their mobile devices four to five hours per day.

Mobile Apps Most Commonly Used by the Lecturers

Knowing the participating lecturers' preferred apps on which they spend more time might allow us to figure out which lecturers could apply blended mobile learning effectively. It is not surprising that all the participants mentioned social media apps. Ibrahim, who is a lecturer, said that the power of social media is in its adaptability according to each user's wants or needs. The result shows there were eight participants who said they have used social media apps a lot, but they did not mention which apps exactly. However, 14 lecturers said they have used WhatsApp a lot, which is expected as this app is considered the most commonly used communication app in Saudi Arabia amongst relatives, family members, colleagues, work teams, friends, or even strangers with the same specific aim. The second app mentioned by 10 participants was Instagram. The third app mentioned by nine participants was Snapchat. Then, seven participants said they have used an email app. Unexpectedly, the Weather app was indicated six times. In addition, four participants mentioned Twitter, four participants mentioned Facebook, and four participants said they use

YouTube a lot. Moreover, four lecturers said they like to use browsers such as Google Chrome and Safari. Three participants said they like reading about local and global news on news apps, three said they use shopping apps, and three said they use alarm apps. Furthermore, apps such as Maps, Calendar, Translator, and Note were mentioned twice. Unfortunately, the university app was mentioned by just two participants and the Blackboard app was mentioned just once. Besides, some apps were mentioned once such as Path, Camscanner, Instructor, Photo Editor, Messenger, Quora, Adobe Fill and Sign, and Pinterest.

Type of Information that Lecturers Usually Search for Using Their Mobile Devices

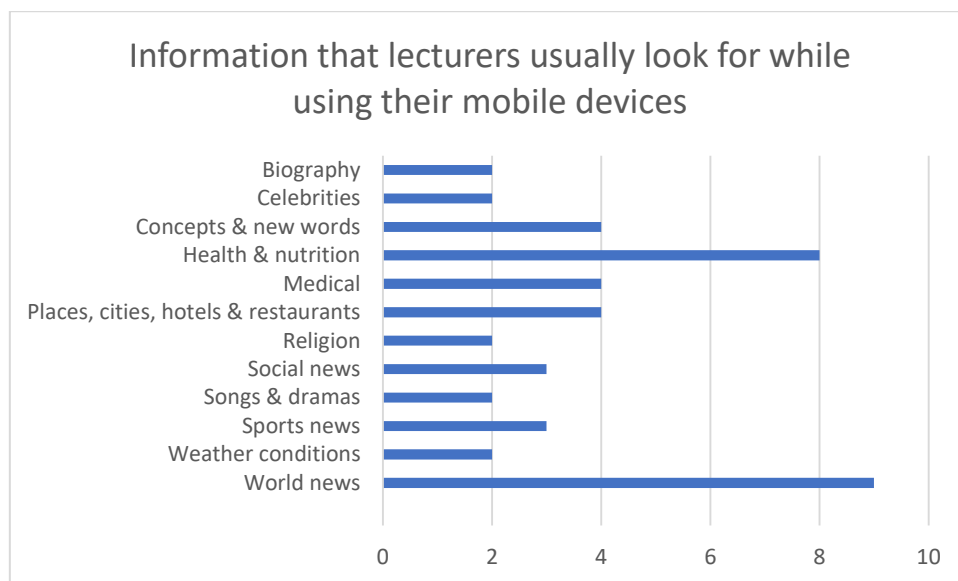


Figure 63 Types of information generally searched for by the lecturers using their mobile devices

As Figure 63 above shows, the most common information that participants look for on their mobile devices is related to world news and health and nutrition. In addition, some search topics were indicated by more than one participant, such as the meaning of concepts and new words, medical information, places, social news, and sport news.

Lecturers' Use of Mobile Devices to Learn Something of Personal Interest

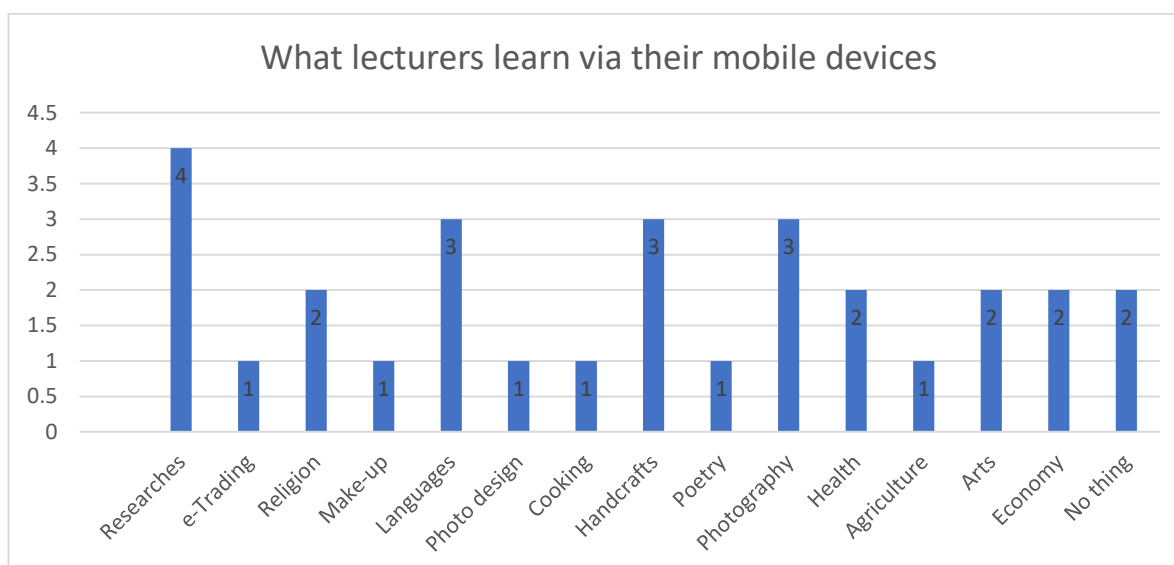


Figure 64 Lecturers using their mobile devices to learn something of personal interest

The figure above illustrates the different personal learning interests seen in lecturers that they follow by using mobile devices. While 22 participants indicated one or more subjects, two of them said they had never used their mobile devices to learn something.

Lecturers' Uses and Habits Related to Mobile Devices for their Career and with Their Students

First, the participants said they use their mobile devices to be aware of the system, laws, and requirements related to their academic career. The results show that all participants use their mobile devices to know about the organisation's system and laws that are related to their academic jobs. While 18 of them said they always do that, six said they do that sometimes.

Second, they use it to learn about the news and events related to their academic career. All the participants checked their department and university news and events by using mobile technologies: 21 of them said they always did that and three said they sometimes did that.

Third, they use it to evaluate and follow up on students' tasks. Further, 17 of the participants said they have used their mobile devices always for evaluation and to check students' tasks and assignments, and seven said they have done that infrequently.

Fourth, they use their mobile devices to share information with students. The result was similar to the previous data presented above. All participants share information with their students via mobile technologies. There were 17 that said they have always done that and seven that said they have sometimes done that.

Fifth, they use it to inform students about assignments and to answer their questions. Specifically, 20 participants said they always announce assignments and answer their students' question by using mobile devices. However, three said they have sometimes done that and one participant said they have rarely done that.

Sixth, they use it to share files and course materials with students. While one participant said they rarely share course materials and files with students through mobile technologies, nine said they sometimes do that and 14 said they always do that.

Finally, they use mobile devices to conduct questionnaires and collect data from students to improve their learning. There were eight participants who said they always create questionnaires and ask their students to participate. Moreover, 13 said sometimes, three said rarely, and no one said never.

The results show the lecturers like to use their mobile devices as a tool to complete their tasks. Most of the participants said they always did so, some of them said they sometimes did so, and a few said they rarely did so. However, there were no participants who said they never did so or that they did not do so before any of the previous tasks. That highlights how useful mobile technology is in education.

Behavioural Intuition

Lecturers' Feelings about Downloading Apps and Gaining the Benefit of Mobile Technologies to Support Their Teaching

All participants said they felt good about downloading apps to support their students' education. Some of them said they have downloaded some apps such as WhatsApp, Twitter, Telegram, and Pinterest. They said they would like to use the Blackboard app and some apps that support the education; however, they had not done it yet.

Conversely, there were 23 participants who thought lecturers and educators should use and reap the benefits of using mobile devices in education. They said there

are many reasons that make mobile technologies useful in education. First, mobile apps offer many choices and have features that support education. Second, mobile devices come in small sizes that make them suitable for any place and room in the university. Third, they offer unlimited data and references that could be reached anytime and anywhere. Fourth, they reduce the consumption of thousands of papers. Fifth, they provide fast communication options and make it easy to share resources for courses. Sixth, using mobile devices would reduce the cost of maintaining computer labs. Seventh, using mobile devices would help lecturers keep pace with new developments and modernity. Finally, lecturers would benefit from mobile technology, as it provides better education that fits their students' needs. However, one lecturer said that she did not think lectures should use mobile technology, because it poses some risks. She said, 'The education will convert from formal to informal and self-learning. In addition, this may cause people to be linked to their mobile devices all day, which reduces direct interaction with other people.'

Lecturers' Feelings about Students' Use of Their Mobile Devices as Educational Tools

The results show that there were 21 lecturers who said they thought it is okay, good, or excellent for students' to use their mobile devices for learning with their lecturers' guidance. For example, Sahar said,

I think that is an excellent and good learning method for the students. I teach the English language, and sometimes, my students search for the meaning of words in the dictionary or for some unclear information on their mobile phones. I also sometimes ask them to practice, do a quick quiz, or complete other tasks on their devices. Actually, I did not prefer using it all the time, but I think a bit of time from the class would kill the routine. In addition, when students complete some tasks on their mobile devices, they would be converted to positive students and increase their interaction. In fact, I have many good and successful experiences and examples of using mobile devices inside lecture halls.

However, two participants said they do not know because they did not try that before. In addition, one said she did not prefer that because it may distract students' attentions.

Educational Experiences

Lecturers' Use of Mobile Devices for Academic Purposes

All the participants said they have used their mobile devices for academics. For example, they use the university app or open the university site with a browser. Moreover, they use it inside and outside the university. They mentioned some tasks such as searching for information, using the Blackboard app, sending emails, reading papers, and creating slides or questionnaires. Apart from this, communicating with other academicians and students through social media apps, taking pictures for some documents, writing notes, connecting their devices to a video projector to display some visuals, posting students' grades, and making announcements are also included amongst the uses.

They all said mobile devices make their academic jobs easier. They said it allows them to complete their work anytime and anywhere. They thought it provides fast communication, facilitates immediate responses, and always keeps them up to date. Moreover, they like using their lightweight mobile devices rather than carrying laptops. Besides, they like using mobile apps and find it to be a great technology.

Lecturers' Previous Experience of Using Mobile Devices for Education in Lecture Halls

While all of the participants said they have used their own mobile devices inside lecture halls for education, most of them claimed they have no previous experience in allowing their students to do so. The results show 19 lecturers said they have no previous experience with students' using mobile technologies inside lecture halls. On the other hand, five of them have done that before. For example, AAA said, 'Yes, I have tried that wonderful experience before. I asked the students to work on a project by creating slides on a certain topic using their mobile devices. They searched for information, then searched for images supporting the subject or video, and then put it together with PowerPoint as slides.'

In addition, Albetool said,

Yes, I had a great experience. I conducted an experimental quiz by using a mobile app. It was a beautiful experience. However, some obstacles limit its success—because some students had not connected to the

internet and the university does provide an open network for students in that building where we were. In addition, the dispersion of students—as there were some of them browsing other things not related to the class.

Surprisingly, the highest number of lecturers did not have any experience allowing students to use their mobile devices inside lecturer halls for any educational purposes. In fact, they had previously not tried this. In my opinion, that is what made students think that the lecturers were one of the barriers to blended mobile learning.

Lecturers' Opinions and Experiences Towards Contacting Students via Mobile Devices and Their Apps

All the participants have positive opinions about using mobile technologies to contact their students for academics. In fact, most lecturers said that would be useful and make the learning process easier. For example, Hifa said, 'I support students' use of the mobile devices, especially to communicate with their lecturers. I used to communicate with my students and sent electronic documents and slides so each one could have a soft copy. Actually, I prefer to do that instead of printing the documents and wasting papers and resources.'

Similarly, Huda agreed and said, 'Actually, I think that is very useful. For example, sending the course materials to the students via a WhatsApp group ensures the information and documents have reached all students, so no students would miss anything.'

Moreover, some lecturers said they thought using mobile devices to communicate with students is good, excellent, or great. For example, Abu Mohammed said, 'I think it is great as it lets one take advantage of modern technology, which suits students these days.' However, three lecturers said they thought 'it is okay'. For example, one of them said, 'I think it okay as long as it makes students' learning process easier.'

In fact, communicating with students via mobile technology would create some extra work for lecturers. As the results show, lecturers did not mind using it. They indicated mobile devices allow them to send immediate responses to their students' questions and demands. They like it, because it is helpful and useful and makes their education easier. I, as a lecturer, was in the habit of using an app called Ask. The

students were interactive and asked me questions regularly, especially during exams. I found that helpful and easy, as I was teaching at three different colleges located at different places in the city. Due to this, my students could not reach me most of the time.

Lecturers' Experiences of Communication with Students via Mobile Devices and Their Apps

All lecturers said they had communicated with their students via mobile devices and their apps.

Communication tool		Number of lecturers
Social media apps (57.5%)	WhatsApp	14
	Twitter	5
	Not specific	2
	Facebook	2
Email apps (25.0%)		10
The Blackboard app (7.5%)		3
Phone calls (2.5%)		1
Other apps (7.5%)		3

Table 18 Tools used by the lecturers to communicate with their students

Most of the lecturers said they like to use WhatsApp groups to contact their students. They said they could share links, PDF files, pictures, videos, or e-books. They could also answer their students' questions. Moreover, some lecturers said they like to use email apps for the same reasons.

Social Influence

The participants agreed that the society and social elements entice them to keep up with new technology. They use their mobile devices to contact people as well as keep themselves updated with the latest developments and news; they also keep in touch with their community.

Academic Social Influence

The participated lecturers indicated the effect the academic society has on having and using mobile devices and their technology. They said they like to know which common apps their colleagues and students use for education. The following paragraphs describe the participants use of their mobile devices for communication with people for their academics.

Lecturers' Use of Mobile Devices for Communication

The participants were asked if they were using mobile devices and their apps to communicate with other colleagues, lecturers from other universities in Saudi Arabia, lecturers from universities abroad, current students, and former students.

First, the majority said they were communicating with other lecturers from the university. Then, 20 participants said they have always communicated with other lecturers using mobile technologies. Moreover, four said they did that sometimes.

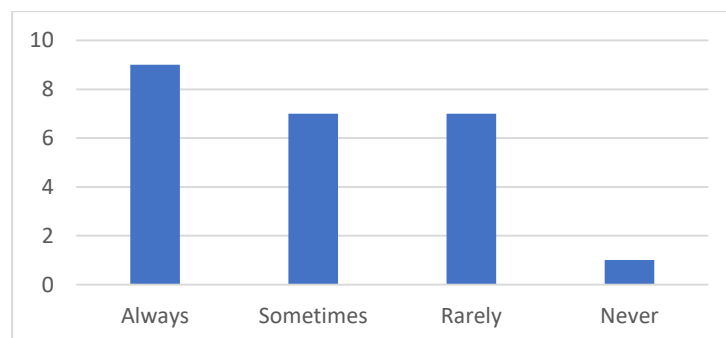


Figure 65 Frequency of lecturers' mobile communication with other universities in the KSA

Second, the figure above shows most participants said they were communicating with lecturers from other universities in Saudi Arabia. While nine of them said they always do, other seven said they sometimes do so. On the other hand, seven said they rarely do that, and one said they have never communicated with any lecturer who works in other universities in Saudi Arabia.

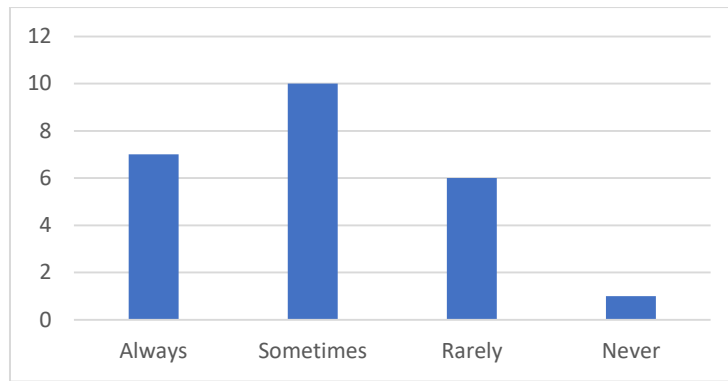


Figure 66 Frequency of lecturers' mobile communication with other universities abroad

Third, most of them said they were communicating with lecturers from universities abroad. There were seven participants who said they always did so in addition to 10 participants who said they sometimes do so. While six said they rarely do so, one participant said they never do so.

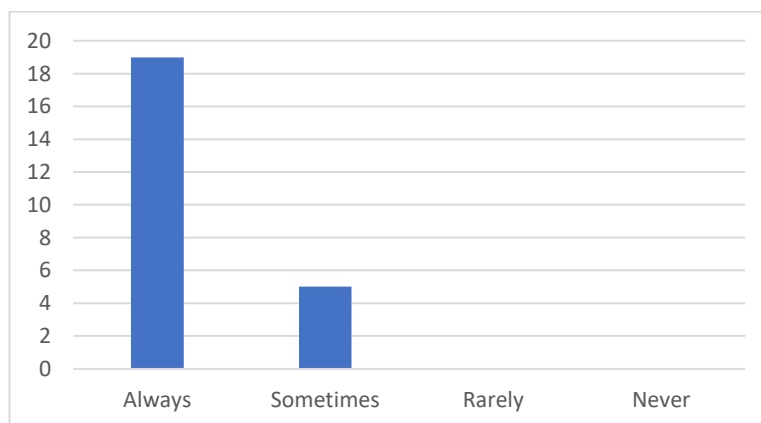


Figure 67 Frequency of lecturers' mobile communication with current students

Fourth, as the above figure shows, all participants said they were communicating with current students. While 19 of them said they always do, five said they sometimes do.

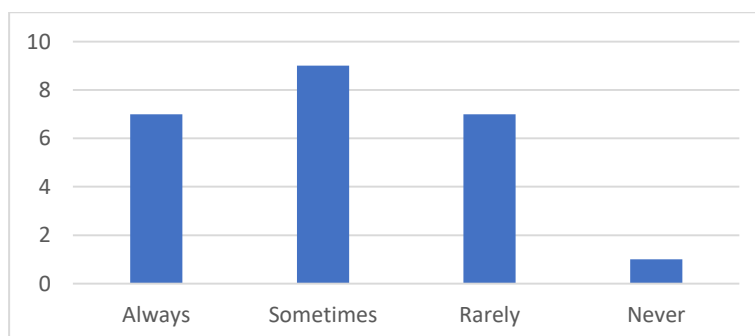


Figure 68 Frequency of lecturers' communication with former students

Fifth, the figure above describes the results of lecturers' communicating with former students. While seven said they always do, nine said sometimes, seven said rarely, and one said never.

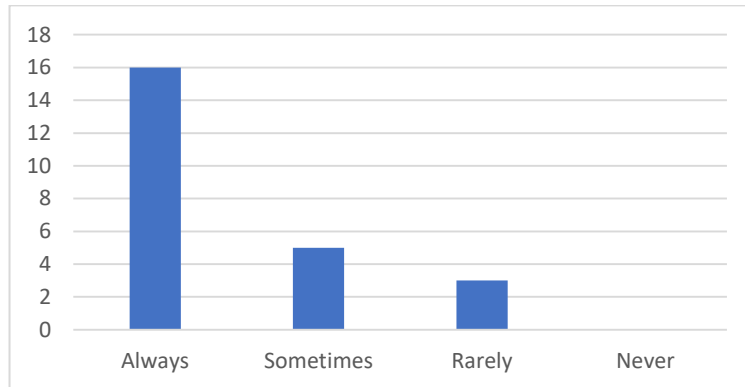


Figure 69 Frequency of discussion via mobile communication with colleagues and peers

Sixth, to confirm whether they held discussions with colleagues and peers in the same field of teaching, 16 of the participants said they always do, while five said they sometimes do and another three said they rarely do.

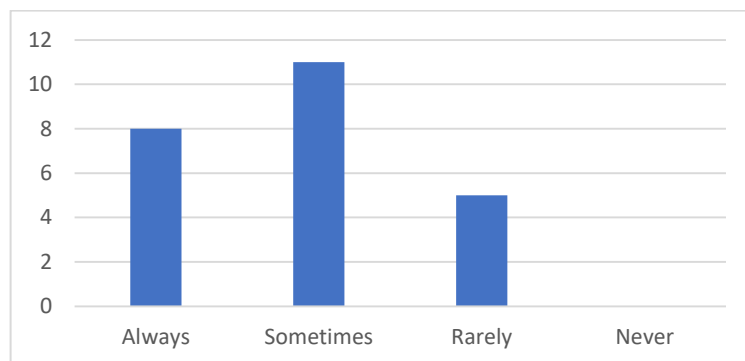


Figure 70 Frequency of using mobile communication to establish relationships with academics for professional purposes

Finally, most participants have established relationships with academics for their profession. There were eight participants who said always, 11 sometimes, and five rarely when asked if they communicate through their mobile devices to establish professional relationships with academics.

5- Important Features of Mobile Devices to Suit Blended Mobile Learning

While one of the participants said he did not understand the question about the important features that mobile devices should have to be used for learning, the rest of them gave many answers. First, 11 participants thought a good and free internet

connection is the most important feature that can ensure the success of using mobile technologies in education. Second, five said the availability of power supplies inside lecture halls or enough battery allows students to benefit from their mobile devices. Third, two participants mentioned a large memory, and other two said a large screen. However, some participants focussed on people skills instead of hardware features. For example, five participants said the lecturer’s class management or students’ searching skills are important for adopting mobile technologies in education.

In fact, the students were asked the same question, and most of them mentioned good internet connection as well. They said the internet networks were not available for students. Moreover, they said most students have their own internet connection, but not all of them have it.

6- Barriers to the Adoption of Blended Mobile Learning

Barrier		Number of participants
Lecturers (29.7%)	Prohibited	5
	Lack of knowledge	6
Poor internet connection (21.6%)		8
Students (40.5%)	Distraction	4
	Students’ lack of knowledge	4
	Students who do not own a device	3
	Large numbers in lecture halls	2
	Non-responsive	2
High costs (8.1%)		3

Table 19 Barriers of using blended mobile learning

The results show that the biggest barrier to the adoption of blended mobile learning is a poor internet connection, which agrees with the results on the most important features of mobile devices. Then, 6 six participants said the lecturers’ lack of

knowledge of mobile technologies, new teaching methods, and new educational technologies are a barrier to adopting blended mobile learning. Moreover, five participants also agreed that the lecturers are a barrier to adopting blended mobile learning; they said lecturers or educators prohibit the use of mobile devices inside lecture halls. In addition, four said mobile devices may cause distraction amongst students who play or do non-educational activities on their devices. Furthermore, four said students' lack of knowledge of using mobile devices is one of the barriers. Three said not owning mobile devices could be barriers in addition to other three who cited the high cost of mobile devices as a barrier. Further, some barriers were mentioned once, such as the lack of equipment in lecture halls, the technical problems of mobile devices, and the common belief that mobile technology is for entertainment and not for education. Conversely, one participant said there is no barrier to adopting blended mobile learning in higher education.

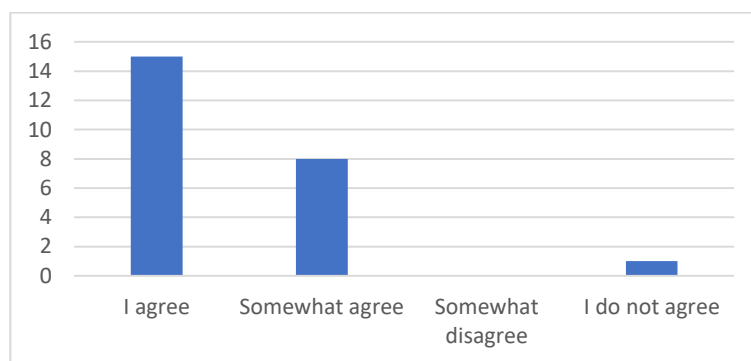


Figure 71 Lecturers need to develop some skills of use mobile devices for education

The results show lecturers are one of the most mentioned barriers. Most of the participants agreed that lecturers need to develop their skills to use mobile devices for education. In addition, they said lecturers are not preferred to use blended mobile learning, because they may resist to change or may not trust students. In reality, four lecturers expressed concerns over students being non-responsive, crowded lecture halls making class management harder, or students spending class hours on other activities on their devices. However, they have been asked about the reasons they are not open to adopting blended mobile learning. The results show there were six participants who answered with nothing. On the other hand, seven said students' misuse of mobile devices convinced them against adopting it. However, five cited no available free internet connection being given to students as the reason. While two said it is not used in the university, some mentioned reasons such as copyrights

issues, change from formal to informal learning, and fears that not all students have mobile device. However, most participants thought students need more skills to use mobile devices for education, as the figure below highlights.

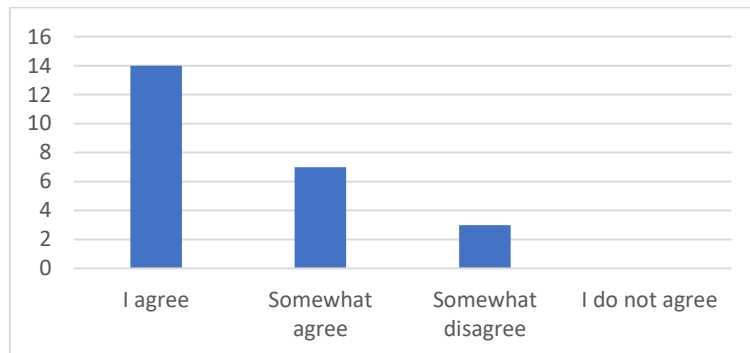


Figure 72 Students need more skills to use mobile devices for education

Summary

Most of the participating lecturers were familiar with the term mobile learning. Moreover, the majority were familiar with blended learning; consequently, most of them were able to understand what blended mobile learning means. Although most of them said the university policy encourages the use of new technology and they were aware of the advantages of blended mobile learning for learners and the learning process, they did not use mobile devices in their classes. The only advantage on which they agreed was the use of mobile apps, such as WhatsApp, to communicate with their students outside of lecture halls. The barriers they listed were similar to those that students indicated previously in Chapters Five and Six—a lack of internet access and the lecturers either prohibiting mobile devices or having no knowledge and skills. Additionally, they were concerned about students' issues, such as their knowledge, ability to own mobile devices, and distractions caused by them.

Chapter Eight: Discussion

This chapter provides a discussion of blended mobile learning based on the perceptions of lecturers and students in Saudi higher education. First, it explores students and lecturers' perception and understanding of the blended mobile learning. Second, it examines the acceptance of technology by using the unified theory of acceptance and use of technology (UTAUT) and the effect of blended mobile learning from the participants' perspective. Third, it investigates the features of mobile devices that are important in determining the success of mobile blended learning. Finally, it discusses the challenges and barriers that the process of adopting blended mobile learning is fraught with.

Using UTAUT as a theoretical framework has helped me understand the perceptions of the participants and connect them to a broader understanding of blended mobile learning in Saudi higher education. In order to address the research questions, I identified four main comprehensive themes based on the key constructs of UTAUT, the research questions, and the data collected from the participants. The themes include the understanding, acceptance, important features, and barriers of blended mobile learning. Then, the discussion revolves around four subthemes in order to answer the research question about acceptance, which is affecting the implementation of blended mobile learning in Saudi higher education.

1- Perceptions

Understanding Blended Learning, Mobile Learning, and Blended Mobile Learning

Across the globe, universities need to adapt their learning environments to keep up with evolving technology. The changing trends in learning have resulted in Saudi Arabia adopting blended mobile learning in higher education (Aldosemani et al., 2019) to meet the needs of the new technology (Badwelan et al., 2016). To research the impacts of blended mobile learning in Saudi Arabia, I conducted interviews with female MA students and launched an open-ended survey with both undergraduate and postgraduate participants of both genders.

Determining students and lecturers' understanding of mobile, blended, and blended mobile learning is crucial for two major reasons. First, it affects the rate at which blended mobile learning is adopted, since people can only implement ideas which they know. Second, proper conceptualisation is instrumental in dissuading the misuse of those approaches in a manner that may undermine learning. Most of the interview participants possess some knowledge or idea about the term mobile learning. While it is unclear where the students derive the various definitions of mobile learning, it is clear that their definitions are based on how the term 'mobile' has been used in Saudi higher education institutions (HEIs). Saudi Arabia is embracing mobile learning that offers education exclusively through technological devices such as mobiles; hence, the implication of the term is being used (Almutairy, Davies & Dimitriadi, 2014). However, the continued use of the term 'mobile learning' in formal education in place of 'blended mobile learning' has led to misunderstandings, and its implementation may result in dissatisfied learners. As discussed in previous chapters, many participants in this study emphasised the importance of studying face to face (F2F) and using mobile learning at the same time. In the first phases of implementation, there was no reduction on the time spent on traditional F2F learning, claiming that the goal of that strategy was to help learners and lecturers embrace online studying (Alasmari et al., 2019).

All interview participants were studying for their master's degrees at Education College and may have the advantage of already knowing the educational terms. However, not having previous knowledge of the terms 'mobile learning' or 'blended learning' highlights the importance of educating students before setting an appropriate plan for the implementation of blended mobile learning. This is because a clear understanding of blended mobile learning will pave the way for both the acceptance of this learning model and its effective implementation to create meaningful learning.

Additionally, the interviewed students revealed that the term 'blended learning' is less understood than the term 'mobile learning'. Specifically, many students incorrectly interpret blended learning to mean the common practice in Saudi Arabia's education system of integrating special needs learners into mainstream classrooms. Though a few students appeared to have some idea of what blended learning meant, they could not confidently define it. Similarly, the students who participated in the open-ended

survey disclosed that the term is rarely comprehended, with the majority of them not having any clue of its meaning. Another 40% of the students participating in survey believed that blended learning was simply the use of technology in place of conventional learning methods. In contrast, the majority of the lecturers, at 63%, had the right idea that blended learning involves the combined use of electronic and traditional educational approaches. However, despite being expected to be more knowledgeable than the students, around 20% of the lecturers took blended learning to mean replacing traditional education methods with electronic or technological devices. Therefore, it is clear that the majority of students in both the interview and open-ended survey groups and some lecturers have little understanding of the concept of blended learning. Moreover, previous research indicates that most students and lecturers have never practiced blended mobile learning (Alzahrani, 2017).

Blended learning has been differently described by various scholars; however, it generally denotes the incorporation of e-learning with traditional methods of learning, especially F2F interactions in classrooms, and can be realised in two major ways. First, e-learning may be used to support conventional learning methods; second, learning technology may be applied when replacing some of the activities in traditional learning approaches (Alnahdi, 2019). There were misconceptions about blended learning amongst some lecturers in Saudi education (Almalki, 2011, as cited by Anas, 2020).

Failure by both the students and lecturers to comprehend blended learning undermines the education system in Saudi Arabia in many ways. From the students' perspective, harbouring the misbelief that this approach entirely substitutes traditional methods may inspire learners to concentrate on e-learning at the expense of F2F interactions with their teachers. This may even have the effect of causing students to skip lectures due to their belief that they will get the same classroom content from their e-learning modules. Similarly, by not knowing what blended learning is, some lecturers are likely to neglect traditional classroom teaching and rely primarily on the electronic delivery of information. The open-ended survey shows that some lecturers think blended learning simply combines the use of technology with conventional physical learning. In this respect, some learning institutions could implement a learning approach lacking the vital features of education technology. According to Anas (2020),

the primary defining feature of technology in blended learning is its accessibility with regard to time and distance. Therefore, utilising the right learning technologies affords students accessibility from any place and at any time.

When compared to mobile and blended learning, the term ‘blended mobile learning’ was shown to be the least understood by the students in interviews and open-ended surveys. However, all students involved in the study understood that mobile devices, particularly the phones, laptops, and tablets, were involved. For the students who previously understood the meaning of blended learning, conceptualising blended mobile learning as the application of mobile devices to e-learning together with traditional approaches was easy. Just like the students, approximately 30% of the lecturers divulged that they had no understanding of blended mobile learning, though the majority of them seemed to know what it is and how to apply it when discharging their duties and responsibilities. Like the other two terms, failure to fully comprehend blended mobile learning may lead to it being misused to undermine education.

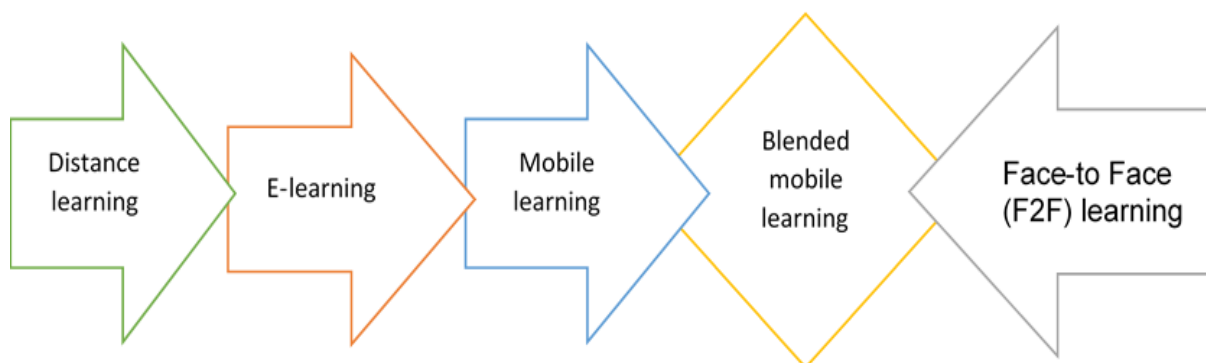


Figure 73 Learning types

More importantly, the fact that the lecturers and the students are equally uninformed about various aspects of blended mobile learning should be taken into consideration in further research studies and by policymakers. In Saudi Arabia, students and lecturers’ misunderstanding of various types of learning models emerges from how they have been previously used. For example, it seems that most individuals in Saudi higher education are not aware that e-learning goes beyond the simple use of computer devices in education but includes time and distance accessibility. Some of the participants confused blended learning with ‘inclusion learning’, because these two terms use similar words in Arabic. Inclusion learning is famously known as the

practice of integrating learners with special needs into mainstream classrooms in Saudi Arabia.

Indeed, in this time of transferring education in Saudi Arabia to online or blended learning, students have begun to use blended learning without knowing what it is. When asked whether they had experienced mobile learning before, most of them said no; however, they said they had used their devices for learning something while moving to acquire new knowledge. In fact, they did have experience with it but did not know it was called mobile learning.

2- Confidence

The interviews and surveys also explored the students' level of confidence in using blended mobile learning. In this context, confidence includes the assurance that the technology will result in the intended objectives as far as learning is concerned. In addition, it should be noted that confidence is buoyed up if the students think that they have the right technical skills to correctly use learning technology. Nearly all the students exhibited high levels of confidence in their ability to adopt blended mobile learning, which was unlike their confidence in understanding the concepts, a feat that appeared to be very problematic. According to Bin-jomman et al. (2018), confidence in using technology is one of the factors determining the success of blended learning.

3- Acceptance

Acceptance is one of the main themes in this discussion, considering the use of the five main constructs of UTAUT as sub-themes—namely, performance expectancy, effort expectancy, academic social influence, habit, and academic facilitating conditions.

Facilitating Conditions and Academics Facilitating Conditions

Al-Azawei et al. (2020) observe that most students are enthusiastic about adopting blended mobile learning in the future, talking about the lack of facilitating conditions as hinderances to the effective implementation of blended mobile learning in Saudi Arabia's higher education. However, some issues positively or negatively affect students' attitudes towards blended mobile learning: easy access to the internet, the amount of time spent using mobile devices, the necessary skills required, and the

appropriate use of mobile apps (Badwelan et al., 2016). Some of the learners encountering these issues expressed their dissatisfaction with this current learning environment. Looking into these issues and how they affect blended mobile learning in Saudi Arabia gives a broad perspective of learners' attitudes towards this model. Unlike previous research, this study extensively analyses the issues affecting the ways in which students accept blended mobile learning.

Internet availability in both homes and HEIs in Saudi Arabia is a challenge that few learners have to face. In general, students consider internet connectivity an important tool in their studies in this model where F2F lessons are incorporated alongside online teaching. Through the proper utilisation of the internet, they are able to extract relevant learning materials and send them to their peers (Shorfuzzaman, Hossain, Nazir, Muhammad & Alamri, 2019). The ability to retrieve learning materials from the internet is a determining factor for the performance of learners. The probability of a student performing well is high if there is internet availability, but if they are unable to access it, they are highly likely to fail. As some students stated, difficulty in accessing the internet in learning institutions is a reason they receive worse grades in the context of blended mobile learning (Abdelaziz, 2020). The challenges of internet availability make it harder to exchange and download learning materials and affect students without easy accessibility to the internet. However, as discussed in Chapters Five and Six, most of the students can now access the internet and share documents with peers. This makes blended mobile learning easy, as they are able to download the appropriate applications and documents and can access various learning materials (Abdelaziz, 2020).

Previous studies differ from this one, as this study does not include culture as a factor in the acceptance of blended mobile learning. According to previous studies, Saudi parents find it hard to offer internet accessibility to their children, because they perceive it as offering them something that goes against their cultural norms and values (Alzahrani, 2017). This study does not focus on culture as a main construct; however, the findings show that culture and the associated norms could affect students' access and use of the internet. The culture of resisting internet accessibility in urban centres is evolving, as people realise the significance of the internet in higher education learning in Saudi Arabia, especially with regard to blended mobile learning.

In fact, low access to the internet is a greater challenge in rural areas, as internet accessibility, specifically in homes, is slow. Additionally, some households are conservative and do not embrace changes. However, this study focusses on adult students, investigating their ability to own a mobile device with internet access. This is important, as it shows that students are accepting blended mobile learning and the challenges they are facing with internet accessibility.

HEIs should ensure that blended mobile learning environments are conducive to the students and ought to embrace the same. Previous studies have shown that the confidence level of learners using mobile devices for learning is determined by how the HEIs acknowledge blended mobile education and how they adapt the school environment to its requirements accordingly. The importance of understanding learners' comfort level when incorporating new technologies is that it provides researchers with a general perspective of where learners stand with regard to technology in higher institutions in Saudi Arabia. Moreover, to ensure the maximum impact of cooperative learning, previous research on blended mobile learning in Saudi Arabia suggests the implementation of real-time interactions between learners and the development of a relationship between communicating and activity sharing.

As with the students, access to the internet and the ownership of mobile devices are the leading conditions facilitating lecturers' acceptance of blended mobile learning. Every lecturer engaged in the study confirmed that they have free access to the university's internet, although some choose to use their private internet. As discussed in Chapters Five, Six, and Seven, unlike the students, lecturers had unlimited capabilities to own devices such as iPhones and iPads. All of the learners owned at least a standard mobile phone. Concerning the conditions of academic facilities, more than half of the lecturers agreed that the university encourages them to use technology and that the lecture halls have the necessary infrastructure for blended mobile learning to be used. Nonetheless, the majority of the lecturers appeared to be unsure about whether the university encourages students to use mobile devices when learning in lecture halls. The role of the lecturers in the acceptance of blended learning in this study agreed with the findings of Mallick (2020), who discovered that more than half of the faculty members in Jouf University endorse e-learning. In his review paper, Alzahrani (2017) traced the development of adopting blended learning in Saudi higher

education and concluded that Saudi HEIs are equipped with information and communications technology (ICT) tools in accordance with the education ministry's objectives. However, he added that lecturers need more training with regard to blended learning. He goes on to recommend that future researchers should investigate the most appropriate blended learning category for Saudi universities (Alzahrani, 2017). Similarly, Aldosemani et al. (2019) pointed out that motivation and training could be used to gain acceptance from some lecturers who may be reluctant to support blended mobile learning.

Performance Expectancy

Most of the issues affecting students' performance expectancy in blended mobile learning were related to skills and knowledge. Navigating the internet to retrieve the relevant document requires some skills that learners ought to possess. Consequently, they must know what documents they are accessing and how to use them. Although the majority of learners in HEIs have acquired the necessary ICT skills and knowledge, there are some who are yet to develop navigation skills. Those students identified the lack of ICT, time management, and blended mobile learning skills as challenges undermining their performance expectancy (El-Sofany & El-Haggar, 2020). Some of the challenges of blended mobile learning were raised by select students who already had negative views related to poor learning. For instance, as discussed in Chapter Five and Six, some students acknowledged that they were familiar with the internet but preferred traditional learning over blended mobile learning. They stated that they expected to perform poorly in their blended mobile learning courses; however, they spent a lot of time on the internet, asserting that they put little focus on their learning goals. This is due to disruptions in the online learning environment. According to previous reports, the majority of students in Saudi Arabia's higher education system were expecting blended mobile learning to have positive effects on their performance results due to the excessive hours they spent on the internet (Alotaibia et al., 2017). Moreover, the students with difficulties accessing the internet demonstrated weak ICT skills and claimed they had not taken a good computer course. However, most students were satisfied with blended mobile learning and expressed high performance expectations, arguing that they would prefer it if all of their Islamic and Arabic courses could be taught through blended mobile learning. Their primary concern, however, was that the subjects that require illustration, such as maths, should be taught through

F2F sessions. Previous studies have ascertained that the more active students tend to prefer blended learning (Hamdan, 2014, as cited by Alzahrani, 2017).

Concerning how blended technology is expected to perform, the majority of lecturers believe that blended mobile learning has the potential to create positive change in lecture halls. However, a few tutors argued that the use of blended mobile learning may cause students to disengage from them. Like the students, approximately 60% of the lecturers agreed that blended mobile learning can improve students' academic performance; however, some lecturers determined that the benefits of blended mobile learning in improving performance depends on a learner's behaviour. Others thought that it might not bring any change to students' performance as compared to when only traditional learning methods are used. Nearly all the lecturers agreed that blended mobile learning is useful for motivation, supports creativity, and enables students access to a large amount of data (Anas, 2020).

Most Participants Agree about the Positive Effects of Blended Mobile Learning on the Learning Process

Blended mobile learning in Saudi Arabia's higher education could become more fascinating and enjoyable, as it provides diverse methods of learning, such as gaming. Moreover, if blended mobile learning classes are well maintained, they could make learning more effective and allow students to easily access learning materials and share them with their peers, making the learning process even more effective (Razek & Bardesi, 2017). Considering that many students in Saudi Arabia are in the digital era, the transformation from traditional methods of learning to blended mobile learning is overall effective to the learning process. Al-Hujran et al. (2014) argue that through this transition, teaching methods are developed and learners' education is enhanced, thus making the learning process more effective. Regarding the students' role in the learning process, blended mobile learning makes the students more active and positive about learning while allowing them access to learning materials and granting them the ability to share them whenever and wherever they wish. Razek et al. (2017) argue that blended mobile learning is more learner centred than teacher centred as in traditional learning models.

Although blended mobile learning has positive effects on the learning process, it also has negative effects, particularly if the classes are not well managed. In addition,

the interaction between the teacher and their learners is minimal, which can have a negative impact on blended mobile learning in Saudi Arabia. Previous studies establish that blended mobile learning affects the learning process in the similar ways stated above (Alzahrani, 2017; Aldosemani et al., 2019). The lecturers had the same expectations as the students concerning the effects of blended mobile learning on the education process. The important finding, in this case, is that using technology together with traditional methods give rise to a positive effect on the learning process through the education. For example, it can make learning easy, interesting, suitable to student needs, and modern.

Effects of Blended Mobile Learning on Students' Academic Achievements

One could argue that students' academic achievements are enormously affected by blended mobile learning. When used appropriately, this learning model positively affects the academic achievement of students, as they have wider access to information and learning materials. Albazie (2018) writes that using mobile devices in the learning process motivates learners and makes learning enjoyable. Through mobile devices, learners can access the internet and a variety of information and learning materials that they can use to better their academic achievement (Turki & Sathiyarayanan, 2018). Most importantly, as discussed in Chapters Five, Six, and Seven, students in blended mobile learning courses can use mobile devices to share information with their peers and, in turn, receive it from them. This facilitates smooth learning, which improves the academic achievements of the learners. However, if used incorrectly, blended mobile learning can have a negative effect on the academic achievements of the students. Using mobile devices can cause distractions through learning games and social media and can be dangerous to the academic achievements of the students. However, previous studies have shown that a majority of the students in Saudi Arabia's HEIs benefit academically from blended mobile learning. A few students are distracted by mobile applications such as games and social media, and this disruption affects their academic achievement negatively.

Effects of Blended Mobile Learning on Students' Motivation

In this era of new technology, it is obvious that incorporating mobile devices in the learning process motivates learners greatly. Learning is diversified through the variety of information and learning materials, and this motivates learners (Alqahtani &

Mohamad, 2015). Moreover, the new technology smoothens teaching methods, which motivates the students to learn; they know learning will be simple compared to traditional learning models where technology is not incorporated. Blended mobile learning shapes the attitudes of learners towards positivity, motivating them to think creatively, as this kind of learning calls for creativity (Alenezi, 2017). The use of learning tools such as gaming applications further motivate students, as they find it enjoyable. What makes this part outstanding is the fact that the educators could know the affect that blended mobile learning can have on the learning process and the learners—that is, whether it motivates them or demotivates them. Earlier studies corroborate that blended mobile learning plays a significant role in motivating students in learning processes in Saudi higher education (Alzahrani, 2017; Alkhalaf et al., 2017). Additionally, most participants in this study agreed that blended mobile learning could increase students' motivation in education.

Effort Expectancy

Effects of Blended Mobile Learning on the Effort to Learn

Blended mobile learning has a significant effect on students' efforts to learn. Its perceived usefulness and ease of use is considered important factors of lecturers' readiness to use and acceptance of mobile learning in Saudi higher education (Aljuaid et al., 2014). Alenezi (2017) says that in this new technology era, learning has become easier through blended mobile learning in Saudi Arabian higher education. The mobile devices used in this kind of education help students access learning materials and knowledge. The simplicity of using this technology, mobile devices, and non-sophisticated learning applications motivates learners and positively affects their efforts to learn (Alowayr et al., 2016). However, the use of sophisticated applications and internet accessibility problems negatively affect students' efforts to learn.

Some of the students find it difficult to navigate these applications and access learning materials and, thus, feel demotivated to learn. In addition, if students lack the necessary ICT skills to navigate the internet and retrieve relevant learning materials, their motivation to learn will decrease. Similarly, the use of apps that use foreign languages may create the need for further effort; indeed, students have said the apps should support the Arabic language. In fact, language proficiency seems to be a barrier in using apps for those who are not good at English (Anas, 2020). This data is

important, because it demonstrates how blended mobile learning affects the learning efforts of students; as with the previous research, this study shows that this particular learning model has enormous positive and negative effects on student learning in Saudi Arabia.

Effects of Blended Mobile Learning on Lecture Halls

As discussed in previous chapters, the participants of this study agree with previous research, pointing out that lecture halls using blended mobile learning are more active, enjoyable, flexible, interactive, affordable, and modern (Alharbi et al., 2017; Alzahrani, 2017). Based on this study's findings, it is clear that the benefits of blended mobile education outweigh its negative impacts on learning in lecture halls. Blended mobile learning incorporates modern and new ways of teaching by using mobile devices, making classes more attractive, and keeping students active. By using apps that add fun and offer accommodations to individual learning differences, such as learning materials that suit individual needs, blended mobile learning is more interesting, exciting, and effective than traditional learning models. The availability of diverse learning materials and students' ability to share those materials make it more interesting and active. Since technology has advanced even in higher education learning in Saudi Arabia, the learning becomes more interesting, and it has been modernised with the use of mobile devices that incorporate new ideas and technology (Alenezi, 2017). Moreover, the use of learning applications, such as gaming and puzzle applications, makes it even more fun. This is important, because it enables educators, curriculum developers, and implementers to understand the effect of adoption of blended mobile learning in higher learning in Saudi Arabia.

Effects of Blended Mobile Learning on Teaching Methods

As noted in previous studies, there are both merits and disadvantages to using blended mobile learning in lecture halls; for example, it is challenging for the teacher to efficiently run the class (Badwelan et al., 2016). Nevertheless, the effort expectancy factor unique to lecturers is in how blended mobile learning can affect teaching methods. For the majority of the tutors in this study, educational technology may positively impact teaching techniques by modernising them and facilitating the handling of huge amounts of information. However, a few lecturers had reservations that the changes might affect their conventional teaching methods, making them look

outdated and ineffective. Still, three lecturers revealed that measuring the effects of blended mobile learning on the teaching methods was not easy. These findings corresponded with those of Alzahrani (2017), who acknowledged that modern teaching methods are infrequently used in Saudi Arabia and ought to be supported. Another recent study by Khalil et al. (2020) recognised the need to transition teaching and learning methods using technology. In particular, Khali et al. (2020) note that teaching some contemporary topics and concepts may not succeed if traditional instructional modalities are relied on.

Habit

Both the development of new technologies and mobile devices' ease of use effect the amount of time students spend on their mobile devices every day for blended mobile learning (Alenezi, 2017). This discussion is of importance, as it helps educators and curriculum planners in Saudi Arabia's higher education to rethink and adopt mobile devices to enable blended mobile learning according to the preference of the students. In conclusion, according to Alowayr et al. (2016), previous studies established that were it not for internet accessibility problems, most learners in Saudi higher education would spend their whole day on their mobile devices.

With regard to the habits of how much time is spent on mobile devices in Saudi Arabia, this study illustrates a large discrepancy between students and lecturers. Students were shown to spend up to 15 hours using mobile devices with the majority of them spending an average of 10 hours on their mobiles. However, lecturers devoted comparatively little time to mobile devices, averaging four to five hours per day. These findings validated those of Wani and Wani (2020), who established that students in Saudi Arabia's universities could be spending more than 10 hours daily surfing the internet, with the better part of that time being used to pursue personal activities. Similarly, Alamri's (2019) research outcomes indicated that personal activities on social media accounted for 47% of overall mobile use compared to education's 30%.

This data implies that mobile applications are not being used sufficiently for education, especially in blended mobile learning environments. Most of the people in Saudi Arabia use mobile applications primarily for communication and other purposes, but students in higher education in Saudi Arabia extend the use of their applications

for learning purposes. The majority of students use social media applications, such as WhatsApp, to share learning materials and communicate with their peers. YouTube is also an important application for students' learning, as it contains a wide variety of learning videos (Alshammari et al., 2017). Moreover, some students state that they use Gmail to send and receive learning materials and updates from the school. Other outstanding applications used by the students include shopping apps such as Amazon, which help learners buy books, read from their apps, and order meals and other necessities. Additionally, there are some students who use apps, such as translation apps, to help them understand diction found in their learning materials.

Tracking this information is important, because it helps explain the kind of mobile devices owned by the students and the kind of applications commonly used for reference in the blended mobile learning in Saudi Arabia's higher education (Alenezi, 2017). Most of the participants in this study confirmed that they have WhatsApp and that they use it regularly, and many of them are members of at least one WhatsApp group. Anas (2020) agrees that WhatsApp is the most popular and preferred interactive communication activity amongst students in Saudi higher education. He added that the observations from his research show that students use this app in their courses for interacting with peers and lecturers as well as sharing learning materials and participating in discussions. The researcher interpreted students' preference for WhatsApp as being a result of their desire to actively engage and collaborate through apps that they use in their everyday lives (Anas, 2020).

Just like in previous studies, this discussion asserts that students' most used mobile applications are social media apps such as WhatsApp, as the students and lecturers can easily communicate and share learning materials through them. Across the groups of both students and lecturers, WhatsApp stood out as the mobile application preferred by more than 70% of the participants. WhatsApp's expediency in Saudi Arabia's education system has been noted by various scholars. In a study by Alqahtani et al. (2018), it was revealed that almost 80% of the students in Saudi Arabia are members of at least one WhatsApp group. Similarly, a study by Alshehri et al. (2019) specified that up to 95% of the students in Saudi Arabia's universities have at least one social media account. Finally, Alshammari et al. (2017) noted that WhatsApp was more popular amongst Saudi Arabia's students and teachers than most other

mobile apps, such as Facebook, which are considerably prevalent in other countries. In this case, the fact that WhatsApp is correspondingly popular amongst students and lecturers is positive, as it helps to avoid a mismatch in the social media preferences between the two education stakeholders. Despite its proven effectiveness in boosting the students' academic performance, YouTube's video streaming application was the least mentioned social media app by both the lecturers and students (Alshahrani, 2018,).

The data clearly indicates that students use mobile devices to search for a variety of information that is essential for the learning process in Saudi Arabia's higher education. Mobile devices play a significant role in blended mobile learning, as they help students search for a variety of learning materials and information that aids the students in their research and study (Alenezi, 2017). The information and learning materials can be accessed anywhere and anytime, and students can search for them and choose to either store or share them with their peers. In defending their theses, students can search for relevant information or study materials from the internet, which are essential for their success. Some of the students use their mobile devices efficiently to explore the world and search for news (Alowayr et al., 2016), while others use it to acquire knowledge on nutrition by searching the internet for information concerning nutrition. Finally, there are those who search for shopping information, such as prices of various books or learning materials, and the internet and mobile devices play a crucial role in their lives. This study is important, because it reveals what kind of information is interesting for the students in Saudi Arabia's higher education to enable designing a blended mobile learning environment. Previous studies on the types of information that students in blended mobile learning search for indicate that most students use applications such as web browsers to search for learning materials and information for their studies and research. Unlike the students, who primarily use mobile devices for social networking, the lecturers were found to largely rely on their mobile devices primarily for research, commercial activities, language translation, trading, and acquiring news. Concerning their careers, it is clear that using mobile devices to find information and news on their areas of study takes precedence over using them to support their teaching.

Behavioural Intention

The data implies that all the student participants support and feel positive towards the use of mobile devices guided by the lecturers for the purposes of learning. The fact that not even a single student expressed a negative feeling about using a mobile device for the purpose of learning guided by the teacher shows that learners are confident with their lecturers' guidance and support that learning model (Al-Hunaiyyan et al., 2017). One point is outstanding: students may fail to use their mobile devices in a way that benefits them in their higher education, and teachers should be trained to ensure that they effectively adapt to the blended mobile learning model. After receiving proper guidance, students should be able to use their mobile devices in a way that is beneficial to their education, such as browsing for relevant learning materials and storing or sharing of information (Razek et al., 2017). This research clarifies the role of lecturers' guidance in relation to students' usage of mobile devices. Previous studies established that although few students did not feel good about lecturers guiding them in using their mobile devices, the majority of them supported the idea and were happy about it.

The data clearly demonstrates that the majority of students enjoy downloading mobile applications that support their higher education learning in Saudi Arabia. The results of this study support previous findings that show students are happy to download learning applications that are essential in blended mobile learning (Shorfuzzaman et al., 2019). For instance, Nora states students download social media apps to help them converse with their peers and share insightful information. Moreover, students find it interesting to download some apps, such as translation apps to help them translate new words; Telegram and Twitter that improve their performance and increase their knowledge; the Papers3 app, which helps students find and share learning materials; and other apps that are free and in Arabic. However, some students express negative feelings about downloading applications in their mobile devices, as they prefer using larger screens to smaller screens for learning and dislike unfamiliar applications (Al-Azawei et al., 2020). This study illuminates how students in blended mobile learning really feel about downloading apps to their mobile devices.

As with the students, the lecturers participating in this study revealed that they are also comfortable downloading various mobile apps that support their educational needs. Additionally, the majority of them admitted that mobile devices are learning tools for students; however, one of the lecturers was doubtful and thought that the devices may be misused by the students, particularly for activities other than learning. To avoid or resolve this problem, students should be guided when using mobile devices in the classroom. This would be effective in Saudi Arabia, as nearly all the students who took part in the research recognised the need to be directed by the teachers when using mobiles (García-Martínez et al., 2019).

Experiences of Blended Mobile Learning

The data shows that although some of the students had previous experience in blended mobile learning, some of them had not experienced blended mobile learning at all. However, all of the student participants had used their mobile devices in one way or another to assist them in learning. According to Alhassan (2016), a majority of students use mobile devices to store learning materials and information and to receive and share these materials with their peers. A number of them also use mobile applications, such as calculators, for learning both within and without classes. Those who are not allowed to use mobile devices in classes, like Rawa, argue that it would be better to use them to store, share, and read learning materials as opposed to viewing them on the lecture screens. Although they are yet to use blended mobile learning, others use their mobile devices to store their lessons and presentations for the class. Moreover, they use their mobiles for their own searches and to access relevant learning materials. Some even use their mobile devices to follow their lectures and record them for future reference. The essence of this exploration is to discover what the students have experienced in the past concerning blended mobile learning in Saudi Arabia's higher education. This study corroborates findings of previous studies, in which a majority of learners have expressed satisfaction in their experience of blended mobile learning while a few have shown dissatisfaction (Badwelan et al., 2016) while acknowledging that some learners are not experienced in blended mobile learning.

Both the students and lecturers participating in this study had good experiences when engaging with others in the courses through the use of mobile devices and their

applications. Students embraced using their mobile devices to communicate within the blended mobile learning environment (Badwelan et al., 2016); however, what is more important is that students use their mobile devices to communicate without being pushed by the lecturers or the institution. The fact that mobile devices can be used anywhere and at any time makes them appropriate for communication amongst both peers and lecturers. Again, the most used mobile application for communication is WhatsApp, as the students can form class groups to receive and share learning documents amongst themselves as well as their instructors. In addition, some use Gmail applications on their mobile devices to form groups, where they can involve their lecturers and share learning contents. Mobile devices are crucial as students can use them to communicate with their instructors and peers enrolled in the same programme to share learning materials, presentations, and notes. Moreover, students find seminars and classes through some mobile app announcements. This discussion is important in that it exposes the opinions and experiences of students when using mobile devices to communicate with their peers and lecturers. In agreement with the findings of earlier studies, it is found that WhatsApp is the most used mobile application by students to communicate amongst themselves and with their instructors (Alshammari et al., 2017; Anas, 2020).

With regard to their experiences, all the lecturers disclosed that they frequently use mobile devices for various educational activities, such as reading emails and visiting their university's website. By communicating with the students and their colleagues, the lecturers have exposed the role played by social media. More importantly, they have showed that mobile devices, especially tablets, are more portable than laptops. Almost all the tutors confirmed that they have employed their phones, tablets, or laptops when teaching. Nonetheless, only a few of them remarked that they had allowed their students to use their devices in class. Considering this, it is evident that the use of mobile devices is only unidirectional, from the tutors to the students. The implication, in this case, is that the use of mobile devices by the students ought to receive more attention as compared to that by the lecturers. This problem of limiting the use of mobile devices in Saudi Arabia's classrooms was pointed out in a recent study by Alshammari (2020). Moreover, the research divulged the lecturers' endorsement of communication with their students using mobile applications. The majority of the lecturers showed that they prefer to use WhatsApp and emails due to

their attractiveness to the students. The outstanding features of WhatsApp include the capability to share large files in a variety of formats, including audio recordings, videos, or documents. However, this study agreed with previous studies that lecturers like to communicate with students via social media (Alshehri et al., 2019).

Social Influence and Academic Social Influence

The data reflects on how societies are transforming with the evolution of technology and that people are interested in having the latest mobile technologies. Evolving technology has affected the social lives of both the students in higher learning education and the people of Saudi Arabia (Razek et al., 2017). Institutions are allowing their students to have internet access, and parents are going an extra step to provide internet to their children. All of the students who were interviewed and their peers own multiple mobile devices that help them access their learning materials every day; they can also search for information to store or share with their peers. The use of mobile devices for these purposes has profusely affected both the social and academic lives of the students in blended mobile learning (El-Sofany et al., 2020). This data is important to investigate both students' social and academic social lives once they are introduced to blended mobile learning. As with previous studies, this study shows that students' social and academic social lives significantly change through the use of mobile devices, as they have access to learning materials anytime and anywhere and can choose to either share or store the information (Alzahrani, 2017).

Besides using mobile devices for academic purposes, lecturers showed that they rely on them to forge social connections with their peers in other universities within Saudi Arabia and all over the world. The majority of the lecturers involved in this study revealed that they frequently connect with their fellow academics in other institutions using mobile devices, and many of them also showed that they occasionally use mobile devices to communicate with their international colleagues.

In conclusion, accepting the use of mobile devices in learning and teaching, students and lecturers are motivated by five major factors. First, blended mobile learning may not work without suitable facilitating conditions. The success of students and lecturers using mobile devices is anchored in the extent to which their learning institutions offer supportive resources such as internet access and policies about the

use of education technology. Second, performance expectancy means that blended mobile learning will improve academics, enhance teaching methods, and motivate learners. Third, effort expectancy connotes how the changes are anticipated to ease the learning and teaching process by making them more effective and productive. Fourth, habits refer to regular behaviours, including participants' prior experiences and the parts of their lives in which they use mobile devices. The accumulation of experiences from individuals' habits and daily usage defines norms, stable routines, and behaviours for using mobile device in education. Finally, social influence entails the extent to which social structures and behaviours support the use of educational technology devices. In this regard, apart from being used for teaching and learning, mobile devices support communication through social networks amongst students and the lecturers within a country and across the world.

4- Important Features of Mobile Devices to Suit Blended Mobile Learning

According to the data, to facilitate a proper transition to blended mobile learning, students should own mobile devices that possess a few specific features. In regular life, almost everyone owns and uses a mobile gadget. Introducing such devices in the education system will make the adoption and continued development of mobile learning easier and more enjoyable for the students (Alenezi, 2017). This is primarily because students are already familiar with the gadgets. Additionally, the gadgets have multiple uses, making students enthusiastic to use them in a classroom context. Most importantly, the mobile devices used in this kind of learning should have sufficient memory storage and a large screen. The importance of ample memory is to allow students to store learning materials without the hindrance of a lack of space, especially considering students have to access learning materials from the internet and store them before or after sharing with their peers (Albazie, 2018). A large screen enables students to read learning materials and information with more ease than they might experience on mobile devices with a smaller screen. To facilitate access to the learning materials on the internet, mobile devices should have a good internet connection. Moreover, a good battery life is an important feature of mobile devices used in blended mobile learning. An excellent quality mobile device would be durable, and its lightness dictates its portability and comfort during its use. Other features of such mobile devices include high processing speeds to ensure they do not take too

long to load data and headphones to help users listen to audio anywhere at any time. This study provides students with a guide to identify the most important features to consider when purchasing mobile learning devices. Previous studies conducted on the required features of mobile devices used for learning indicate the same features as those identified in this study (Chanchary et al., 2011; Moreira et al., 2018).

In outlining the important features that mobile devices and blended mobile learning should have, the students placed emphasis on internet connection and battery life, as they are the most commonly experienced problems. Though the students might not have fully understood the significance of each feature that they mentioned, their suggestions matched the standard features of education technology, as outlined by many researchers. Anas (2020) delineated four vital qualities that blended learning technologies should have. First, the storage capacity to accommodate large documents, videos, and audio recordings is very important. In this regard, the storage capability of the devices should be inexpensive, efficient, and able to facilitate easy information sharing. Second, access—or the simplicity with which the stored files are reached for use, sharing, or any other purpose—is necessary. Notably, access implies that blended learning technology should have the ability to provide materials at any given time wherever the users want. Internet availability is one of the means of enabling access that was most frequently brought up by the students. Nevertheless, they might not have been aware that other techniques of supporting access include local area networks (LANs) and Bluetooth connectivity. Third, Anas (2020) claims that effective blended learning should have multimedia capabilities and the ability to support various media formats. For example, for the students with visual impairment, the technology ought to be able to convert written content to audio or any other suitable format. Fourth, Anas (2020) notes that the capacity for personalisation is vital. In this regard, blended learning technologies should allow learners to customise their platforms by adding support applications such as calendars, dictionaries, and catalogues to their devices. Apart from that, personalisation means that the students should be able to change features and functions to suit their needs. For instance, video or audio players should be adjustable to allow users to change the speed of playback and the quality of images or sound. Determining the expected features of learning technologies was necessary considering that blended mobile

learning in Saudi Arabia has been affected by technical challenges amongst many other problems (Alzahrani, 2017).

In the open-ended survey targeting the lecturers, internet connectivity and storage stood out as the most important features of blended and mobile learning technologies. However, a unique finding, in this regard, is that lecturers diverted the attention from the devices' hardware and software features to how users' skills affected their use of technology. Specifically, most of the lecturers were candid that their universities offer the required technical and technological infrastructure, but most of them lack the requisite skills (Alzahrani, 2017). Although only one lecturer disclosed that he did not have any idea about what important features learning technology should have, this should not be ignored since it might undermine blended mobile learning in a significant way. This infers that the application of blended learning may generally fail if the lecturers who are in charge of a faculty or department do not appreciate technology. Compared to the students, the lecturers seemed to be less motivated to adopt and use technology, and this information should be thoroughly deliberated by education policymakers. Therefore, the training of academic staff should be given priority by educational institutions, since disregarding ICT skills may lead to very big challenges (Alzahrani, 2017).

In light of this information, the important features of blended mobile learning technology, as outlined by the students and lecturers participating in this study, included the storage capacity, internet connectivity and battery life of mobile devices. Unlike the students, most of the lecturers spoke about the underlying challenges associated with lacking ICT skills; therefore, training should be the main focus of the education policymakers. Accordingly, the dynamic nature of ICT makes it hard for both the students and lecturers to be well updated as far as frequently changing technology is concerned. For that reason, regular training and refresher courses on ICT ought to be provided at learning institutions.

5- Barriers and Challenges Faced in the Implementation of Blended Mobile Learning

The data above depicts the barriers of adopting blended mobile learning. One of the major barriers to the adoption of mobile learning is the lack of training amongst

teachers to adopt blended mobile learning; as a matter of fact, some teachers opt for traditional methods of teaching. In order to facilitate proper blended mobile learning, teachers must receive training on how to go through it and they must use blended mobile teaching techniques in their teaching (Alenezi, 2017). This study agrees with previous research that determined that the high cost of the internet and mobile devices makes it hard for some students to afford them, thus adversely affecting the widespread adoption of blended mobile learning in Saudi Arabia (Al-Azawei et al., 2020). The lack of internet availability is another factor that affects how blended mobile learning is adopted in higher education in Saudi Arabia. If students are unable to access a stable internet connection, they will most likely be unable to access or share learning materials from the internet. Another factor that limits the adoption of blended mobile learning is the inappropriate use of mobile devices in classes, as some students use their mobile devices for purposes other than learning (Albazie, 2018). Other factors include students who do not own mobile devices, the loss of data due to damage to the mobile device, and some students who are unaware of the fair uses of mobile devices. This data is significant, because it expands the understanding of why it might be difficult to adopt blended mobile learning in Saudi higher education learning. Similar to this study, previous studies on the factors limiting the adoption of blended mobile learning indicate that the lack of teachers' training was the main factor adversely affecting the adoption of blended mobile learning in Saudi Arabia.

In both the interviews and open-ended surveys, students indicated that they are negatively affected by poor internet connectivity, the cost of buying mobile devices, and the discouragement they receive from lecturers with regard to using blended mobile learning. In Saudi Arabia, poor network coverage and connectivity is a leading problem that has been found to undermine the use of technology in schools by many scholars. As previously stated, internet accessibility is integral to effective blended learning technology; therefore, poor internet connection may prevent lecturers from easily sending learning materials and cause create challenges when accessing them (Alzahrani, 2017). Similarly, it is apparent that social media plays a critical role in blended learning. For that reason, poor internet service hampers students' use of social media platforms such as WhatsApp. The cost of buying mobile devices, gaining ICT skills, and enabling internet connection are shown to have a significant effect on students. In most of the learning institutions of Saudi Arabia, the cost of learning

technology is mainly paid by the students, implying that learners from poor families are the most affected group.

It is, however, interesting to note that students identified their lecturers as the main barrier preventing them from using blended mobile learning (Alshammari, 2020). Similarly, the majority of the lecturers in this study admitted to undermining the use of learning technology in schools. In this regard, several factors that cause lecturers to discourage students from using educational technology became clear. For example, since some lecturers may be lacking ICT skills, they cannot direct the use of blended mobile learning; therefore, they opt to suppress the use of mobile devices in the classroom. However, even if they have the required ICT skills, some lecturers are worried that blended learning might disrupt students' learning in lecture halls as they may use apps not related to the class. In addition to what the students stated as the usual barriers, lecturers emphasised both congestion in the lecture halls and students without ICT skills as some of the impediments affecting blended learning. In many of Saudi Arabia's HEIs, the number of students has been growing and this might have overwhelmed the available technological resources for learning.

Therefore, these barriers have been fully documented by researchers. Nonetheless, social barriers are rarely featured in studies despite commonly undermining the use of educational technology in Saudi Arabia. For instance, with regard to students' internet use, gender disparity is a main problem. Because not all households can afford to have a home-based internet connection, some students depend on internet cafes in towns or commercial centres. This means that female students are predominantly affected by the lack of internet, as the culture and social tenets of Saudi Arabia can sometimes discourage them from visiting social places. Similarly, female students' use of home-based connections is sometimes regulated by their parents or guardians. In this study, the lecturers agreed that regular ICT training should be given to the academic staff and students as one way of adopting blended learning in Saudi Arabia. Concerning the lecturers being viewed as barriers to blended learning, policymakers are required to position the academic staff as the major stakeholders buttressing the use of educational technologies in schools (Alamri, 2019).

Update from 2021

I have asked the participants for their contact details if they do not mind me contacting them for more information. In January 2021, I made contact with nine of the participating students to update some information; they reviewed their responses and confirmed there were no major changes between now and then. Additionally, they confirmed that they had started to use Zoom for their virtual lectures; however, the lecturers use the platform with their microphone but without their cameras, so everything is still similar to their old methods of teaching. Learners participated in classes by replaying the lecturers' questions by typing them in the chat section or using their microphones. Participants only returned to their colleges to complete exams and handle some projects. Although each college is located in a different part of the city, all participants, especially women, were dissatisfied that the campuses had no open internet networks. The sole exception was two participants who are studying computer science. One of them said that the computer college continues to offer available networks inside the buildings. Unfortunately, one of the participants told me she was unable to complete the term, and she and her friend along with many colleges were withdrawing from their programmes because of the low marks they had achieved. She said she had thought the technologies would increase her academic achievement, or at least not change it, but what happened was the opposite. She claimed that both the lecturers and students need more skills to transfer the education from F2G to online or blended learning. However, all nine participants agreed that mobile devices were the secret weapons that helped them through this difficult time. They said that mobile devices have been proved to be important as educational tools, not just as a gadget for communication or entertainment. Most of them used their mobile devices to learn and agreed their education is easily travelling with them through the lockdown.

Summary

The discussion revolved around four major themes affecting the adoption and implementation of blended mobile learning in Saudi Arabia. First, it was necessary to explore students' and lecturers' understanding of blended learning, mobile learning, and blended mobile learning, since this is the starting point of applying technology in education. The success of blended mobile learning depends on how its various concepts are understood and appreciated by all stakeholders. Second, the UTAUT

was used to widely examine the acceptance and use of technology. In this model, it is clear that the acceptance of blended mobile learning is affected by performance and effort expectancy, social factors, habit, and facilitating conditions. Concerning the first two aspects, the users of blended learning are interested in knowing how their academic efforts and results will be positively impacted by technology. Third, it is critical to understand the important features of the required technology to determine the success of blended mobile learning. In this regard, the common features expected in any learning technology must include storage, connectivity, and ease of use. A long-lasting battery life and flexibility are also vital features. Nonetheless, the barriers undermining blended mobile learning form the fourth important consideration. Common barriers include poor internet connectivity, unsupportive lecturers, cost, and societal problems such as gender inequality. The findings from this study are important for many reasons: First, they may be used by the government of Saudi Arabia to make policy changes on how blended mobile learning should be improved. Second, they can be implemented at the university level, so that lecturers are able to know how they should boost their academic activities using technology. Finally, this study has recommended various points that researchers should focus on in future studies.

Chapter Nine: Conclusion, Implications, Limitations, and Recommendations

Conclusion

The world is experiencing unprecedented technological change. Currently, many sectors have integrated digital tools to gain competitive advantages. Education is no different. In this field, using mobile learning in a blended environment, which is called blended mobile learning in this research, is a crucial tool that can enhance instructional strategies in higher education institutions (HEIs). This study takes a comprehensive look at the perspectives of both learners and lecturers on the use of blended mobile learning. Since the strategy is new, it is important to evaluate the views of the different stakeholders. In Saudi Arabia, traditional learning models have been held face to face (F2F). However, it is practical to inculcate new methods that can improve learners' outcomes and enhance educational efficiency. The setting of education has changed to include online classes in a blended mobile learning environment. This allows for the provision of education without physical classrooms. This study delved into the link between students' behaviours and how they ultimately perceived blended mobile learning setups.

This study explores the division between how students use mobile devices for informal self-education in their everyday lives and the expectations in their educational lives in HEIs where the use of mobile devices as a learning tool inside lecture halls is forbidden by the lecturers. While the Ministry of Education in Saudi Arabia encourages the use of new technologies in education, especially blended learning, few lecturers are currently using it in Saudi universities (Alebaikan et al., 2010; Alzahrani, 2017). This study is concerned with investigating lecturers' and students' perceptions and understandings of blended mobile learning. It is one of a few studies that focus on blended learning using mobile devices in education. This study reveals stakeholders' readiness and willingness to adopt blended mobile learning in formal education.

In terms of theory, this study contributes an understanding of blended mobile learning model as they are adopted in the field of higher education. This study is the first to explore using mobile learning in blended learning environment in Saudi higher

education, and it aims to help educators in Saudi Arabia design meaningful education using modern learning methods that suit this age.

The study seeks to investigate the perceptions of both lecturers and students, as blended mobile learning is adopted in higher institutions in Saudi Arabia. The purpose was to examine the underlying opinions, attitudes, and reservations of stakeholders in the realm of blended mobile learning. As Ellis et al. (2018) pointed out, students' perceptions of learning processes are an important indicator of their overall understanding and comprehension of the topic. Consequently, before implementing a new process, such as blended mobile learning, it is prudent to examine the behaviours and interactions within a cohort population participating in such a plan. This study delves into the behaviours of students and lecturers who intend to implement blended mobile learning.

Education has crossed significant milestones. Different instructional strategies have been developed to improve flexibility of learning and learning outcomes for students (Alebaikan et al., 2010). In this research, the authors have noted the contribution of e-learning in revolutionising education. The rapid proliferation of technology has led to improvements in mobile gadgets and the introduction of other technological platforms that can be used to support education. Blended mobile learning stands out as a new strategy in education. It involves the integration of both F2F and digital learning processes. This study seeks to evaluate the attitudes of students and their lecturers in the process of integrating the blended mobile learning model in education. This study endeavours to answer the following questions:

1. What are students' and lecturers' perceptions and understandings of blended mobile learning in Saudi Arabia?

Saudi students' understanding of the terms mobile learning, blended learning, and blended mobile learning has been evaluated in the research. Comprehension of the concept differed amongst the study's cohorts. Most lecturers understand and are familiar with the concept of blended mobile learning. Educators in Saudi Arabia tend to believe that the approach can enhance students' learning experiences. Given this, some of the instructors expressed support for blended mobile learning. However, there were some lecturers who were unfamiliar with the technique. The concept is not well

recognised, because educators have not received proper training. The lecturers acknowledged that technology is important and can simplify teaching. However, instructional applications that facilitate the dissemination of knowledge to students are costly for learning institutions.

Students in the study pointed out they had different experiences with blended mobile learning. Most of the students were not well versed on the concept. However, those who were familiar with the teaching method were excited about it and recognised that technology can improve their learning capacity. Students spend most of their time using mobile devices and the internet, and some learners have leveraged mobile technology for educational purposes. They recognise that technology makes learning easy. Provided a person has an internet connection or a mobile device, they can access learning materials from anywhere. Despite the fact that many of the students were not informed regarding the use of new technologies for learning purposes, most were open minded about the process and willing to give it a try.

The study found that over 90% of the respondents understood mobile learning. However, blended mobile learning was less clearly understood. Notably, the interview respondents (who are master's students) had diverse definitions of blended mobile learning.

2. What factors affect students' and lecturers' acceptance of blended mobile learning in Saudi Arabia?

This research explored students' and lecturers' acceptance of blended mobile learning. There are different factors that affect this acceptance; therefore, the factors associated with the unified theory of acceptance and use of technology (UTAUT) were used in combination with habit from UTAUT2 to evaluate acceptance. Moreover, there have been changes to academic social influence and academic facilitating conditions.

The study revealed that the participants were conversant with the changing technology. All of them had mobile gadgets, and most owned a mobile phone that was a new version. This shows the penetration of digital technology. The study found that students had a positive expectation of how using mobile technology in learning affects performance. The participants' habits reveal a strong belief amongst students that blended mobile learning has the power to enhance their studies. This was supported

by the availability of an internet connection, which allows them to participate in blended mobile learning. The respondents generally agreed that they had adequate internet access.

In Saudi Arabia, learners and instructors who own mobile devices and have easy access to the internet readily accept blended mobile learning. Even though most learning institutions do not offer internet services for students, some learners are able to access the services privately, and this makes it easy for them to download learning applications and educational materials. Owning a mobile device is also important in research and learning processes. All the learners were in possession of a mobile device, but only some of them had a laptop and preferred blended mobile learning.

Most of the participants believed that blended mobile learning has a positive effect on their performance and ability to learn, and they agreed that using a mobile device makes learning flexible, effective, enjoyable, attractive, active, and modern. Besides, the academic social influence is a key factor affecting behaviours regarding mobile learning. It appears mostly in communication between peers, as they mainly communicate through mobile apps. In fact, this communication is a key aspect of learning. Students argued that they had productive interactions with their lecturers through digital platforms. These interactions were enabled through platforms, such as WhatsApp, email, texts, and phone calls. In the same context, blending mobile learning proved to motivate students. The use of mobile devices improves learning outcomes by providing students with flexible means for accessing information. In addition, these gadgets are available to learners every time they need them, making it easy to continue research on different topics. This study points out the integral learning challenges that have been tackled using mobile phones, including reducing boredom, increasing excitement and creativity, and making students comfortable. The study highlights significant aspects of pedagogical development by looking at the attitudes of learners. This aids the quest to implement blended mobile learning, since it provides the views of critical stakeholders within the education sector.

Habit is an integral social phenomenon considered in this study. Participants who tend to habitually use mobile devices are more likely to accept blended mobile learning. In this case, it appears that issues such as the amount of time these devices are used, the type of mobile device used, the nature of the work accessed through

online platform, and the time spent browsing the internet indicate people's willingness to use mobile devices for formal education. Most individuals spend six or more hours per day using their mobile devices. This shows that students have time to complete academic work using the same gadgets. Moreover, they mainly use social media apps for reasons such as communication, fun, and self-education. Understanding these habits can aid academic instructional design and help lecturers choose the most appropriate teaching methods for this generation.

Another factor that is instrumental to creating facilitating conditions for blended mobile learning is the education institutions. Universities and colleges need lecturers who are knowledgeable about technology and use it for teaching and learning purposes. School management also has to source equipment, such as mobile devices or laptops, and the internet to facilitate the transfer of knowledge. The institution also needs to incorporate an app or website that contains a portal for students and lecturers. Such a platform aids in the exchange of information between educators and learners. Instructors can easily post teaching materials and instructions where students can access them, and students can easily submit assignments. Having the right resources encourages both teachers and students to embrace blended mobile learning.

In Saudi Arabia, however, most lecturers have incorporated a zero-tolerance policy when it comes to using mobile devices during class time. Since students are afraid of disciplinary action, they shy away from using mobile devices for learning. Some lecturers have been accepting of the blended mobile learning technique, because they benefit from using the education institution's website. Many students agree that technology has been advantageous in facilitating access to learning materials. However, due to teachers' reservations regarding mobile phone use in the classroom and the lack of an updated application, some students are unwilling to accept blended mobile learning. The university's policy concerning the use of mobile devices and technology for learning is also a factor that can discourage individuals from taking this approach. If educators were to agree to allow mobile devices in lecture halls, the blended mobile learning approach would be more accessible to students. Students and lecturers are open minded regarding using mobile technology, if it proves itself to be fundamental in facilitating learning and promoting academic achievement.

Most of the students were excited by the new prospects opened up by mobile device technology and were happy that the model has simplified the research process and promoted knowledge transfer. These students are positive that under an educator's supervision, blended mobile learning can be maximised. Others, however, felt that smart devices are a distraction. These learners are of the opinion that the use of technology affects a person's ability to concentrate, and hence, they suggest that the educators should maintain control over how the students make use of mobile devices and laptops during class hours.

The lecturers appreciated how easy it is to share information with the students. They felt that mobile devices have facilitated distance learning and that technology helps in interactive teaching. However, some lecturers were concerned that mobile devices reduce students' ability to concentrate on class materials. For this reason, they felt that banning the use of smartphones in class is the only way to get the students to concentrate.

Rapid changes in technology are a significant factor that influences behavioural intention to adopt blended mobile learning amongst students and lecturers. This study shows individuals seek to own the newest model of their phones to be benefitted by the latest mobile technology and to stay up to date. The behavioural intentions behind using mobile devices were evaluated. The majority of the respondents have used mobile platforms for self-education and to research personal issues. Therefore, blended mobile learning remains integral to shaping the future of education. It is an accessible learning method that not only helps students improve their academic work but also contributes to the overall improvement of students' skills, preparation for future, and refinement of lifelong learning.

3. How do students and lecturers use mobile technologies for education and learning?

Students and lecturers use mobile technologies for learning. The use of the blended mobile learning is crucial in education, because it enables fast and easy access to information. Educators can conduct research and post course materials online. Mobile technologies also promote interactive teaching and facilitate discussions regarding course materials for both instructors and learners. Students can readily search for and

obtain educational information using this approach. Mobile devices aid in research, and learners can gain new insights and expand their knowledge base by accessing instructional materials online. They can also follow up on YouTube videos to better their understanding of intricate concepts.

4. How does blended mobile learning affect higher education?

The blended mobile learning model has revolutionised teaching and learning in higher education. F2F learning has maintained traditional teaching methods and direct interaction amongst students themselves and between students and lecturers. Technology has made it enjoyable for students to learn. Additionally, it has enhanced and promoted collaboration amongst learners. Through mobile devices, students are able to share course materials, organise discussions, and brainstorm during group assignments. Blended mobile learning also saves paper, making it more sustainable. The model has been proven to further academic achievement. Ideally, the approach motivates students to learn. The internet serves as a hub that contains all the information and can provide assistance when a topic or concept proves problematic. In higher education settings, students can also use mobile technology to communicate with their instructors and engage in discussions regarding course materials or difficult assignments. Lecturers can also provide students with educational apps that can enhance their learning process. Through these sites, students tend to learn new languages, hobbies, and other skills.

5. What are students' and lecturers' opinions regarding blended mobile learning?

Most students were excited by the new prospects that mobile technology gives rise to. The learners were happy that the model has simplified the research process and promoted knowledge transfer; they are positive that under educators' supervision, blended mobile learning can be maximised. Others, however, felt that smart devices are a distraction. These learners were of the opinion that the use of technology affects a person's ability to concentrate. Hence, they suggested that educators should maintain control over how students make use of mobile devices and laptops during class hours.

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recognised that technology aids interactive teaching. However, some lecturers were concerned that mobile devices reduce students' ability to concentrate on class materials, and given this, they felt that banning smartphones in class is the only way to get the students to concentrate.

6. What challenges and barriers affect the implementation of blended mobile learning?

In this section, the most common barriers to adopting blended mobile learning are discussed. First, most universities in Saudi Arabia do not provide internet services. This can make it difficult or impossible for students to conduct research. In addition, some learners do not have sufficient resources to purchase their own personal mobile devices, which makes it difficult for them to engage in blended mobile learning. Many students do not understand how the model operates, and given this, they are unwilling to give it a try. Some of the participants feel that mobile devices and technologies are a distraction and cannot add any benefits to traditional methods of teaching. Most learners who oppose this approach do so because they prefer F2F interaction with the lecturers. However, the majority of students are of the opinion that anyone can benefit from this approach. In fact, they are discouraged by and do not support the fact that many lecturers are stuck in their ways and unwilling to embrace technology. Lecturers can also act as barriers because many do not allow the use of phones in the classroom. This places the students at a disadvantage as they are unable to access the benefits of technology. Given this, there is a need to spread awareness about the benefits associated with modern technology in learning.

In conclusion, the results and analysis section explores how the current research fits the existing literature. Arguably, the cited research has indicated the relevance of mobile learning in education, which corresponds with the views of students. The literature indicates that the range of available technology and accessibility of the internet are important aspects that influence blended mobile learning. Students also attribute access to mobile phones as well as upgrades to the most recent versions as being integral to facilitating learning. Online learning offers a new method for studying (Al Masarweh, 2019). This has prompted institutions in Saudi Arabia to adjust to this global trend. Notably, the move to integrate online learning has gained traction in different universities and has been supported by available data on the effectiveness

of digital platforms to enhance learning. The fundamental aspect of studying is research. Thus, the use of mobile phones and the internet is effective for conducting comprehensive research. The literature explicates key components of blended learning, including the use of instructional technology, the integration of diverse pedagogical approaches, and a combination of F2F learning and web-based approaches along with the integration of actual job tasks that result in an effective learning environment (Driscoll, 2002). This was captured in the results of the current research and the subsequent analysis, given that the respondents had an understanding of how technology improved learning objectives.

Most importantly, the underlying benefits of blended learning revolve around improvements in learners' motivation and studying experiences. Flexibility stands out as a vital benefit of integrating technology into traditional learning approaches. As Shand et al. (2018) point out, blended learning helps students collaborate and improve their experience. This highlights the role of technology in facilitating group work. It allows students and lecturers to communicate instantly regarding pertinent issues in their studies. The analysis reveals that the potential for exchange of information is a critical factor that contributes to the introduction of technology in education.

This research has provided a significant contribution to the quest of understanding the connection between blended learning and improved educational outcomes. Specifically, it addresses the underlying questions regarding technology use in education and explores technology's potential to advance education. Some of the main benefits include improving learners' motivation and making instructional strategies more efficacious. Gaps still exist in the attempt to connect technology with the overall improvement in learning and pedagogy. This is because it is difficult to establish the effect of technology on learner outcomes. There are also gaps regarding the universality of the technology used by participants. Students who participated in the study own different types of phones; therefore, their views cannot be universalised to the general population.

Validity and Methods

The research consisted of purposeful interviews with master's students who chose to participate through volunteer sampling. The selected individuals were those to whom

the researcher had convenient access and consisted of 12 female students. In addition to the interviews, 72 students (22 males and 50 females) completed open-ended questionnaires. The study then included 24 lecturers. In hindsight, the research questions focussed on discerning the perspectives, level of acceptance, important features, and barriers of blended learning faced by lecturers and students. These questions guided the research methodology, and given their nature, a qualitative approach was taken to determine the views of the students and lecturers. The interview technique remains integral to understanding people's views. It is a critical tool for collecting information on a contemporary issue, such as using mobile learning in a blended learning environment.

Content validity is a crucial factor in the research. In this case, I looked at the connection of the interview questions as well as the questionnaires. The validation process involved using a retrospective study in the field to help create relevant questions. Subsequently, a study population that was appropriate for the research objectives was selected. The study's concentration on Qassim University in Saudi Arabia was vital to understanding the perspectives of lecturers and students regarding the implementation of blended learning.

Limitations

While efforts have been made to select the best methods and samples to determine and represent Saudi perceptions of blended mobile learning, this study has some limitations. First, the research is geographically limited to Saudi Arabia, and therefore, the results can only be generalised to this country. Second, blended mobile learning is a new learning method, and therefore, the participants in this study did not participate in formal blended mobile learning courses for this study; their perceptions were limited to their personal experiences and own uses of blended mobile learning tools. Third, even though this study tried to include participants from different age groups and genders, most of the participants were female.

The underlying limitation of the study revolves around the sampling process. It was difficult to find male volunteers for the interviews. This caused a bias in the results. In addition, there were few articles in the same field, and therefore, it was immensely challenging to find evidence to complement the research. Infrastructural limitations do

hamper access to the internet and technology amongst students. Hence, it is difficult to gauge the impact of blended learning in HEIs in Saudi Arabia.

Challenges in this Study

This study faced several challenges. First, the study investigated participants' perceptions and feelings towards blended mobile learning in depth; however, it began by conducting interviews that were time consuming and required significant effort from both the interviewees and interviewer. Some of the participants cancelled their appointments and withdrew at the last minute. One participant changed her mind after completing the interview and requested that her recorded interview be deleted. That interview and all the participant's information were deleted. In addition, there were fewer male participants than female participants, since it was difficult to find male participants.

The results can be generalised to higher education institutes that have technological capacities similar to those of Qassim University. The results are skewed in favour of the female population; however, they will be beneficial when looking at female students' perspectives on education. The input of male students was captured through semi-structured questionnaires. The views of students at this university are useful to advance knowledge on blended learning. The generalisation of the study means that the results are applicable in other settings that are similar to Qassim University, such as some universities in the countries that are in the same geographical area. Ultimately, the study cannot be generalised to the entire population; its findings are limited to a unique subset of society.

Contribution of Research

Technology in education is a big issue. There is a need for in-depth research on mobile learning in Saudi education; the studies could be used to provide insight into using mobile learning in higher education to develop students' understanding and skills (Alharbi et al., 2017). The findings of this study provide vital information for enhancing students' and lecturers' acceptance of blended mobile learning in order to ensure its successful implementation in the teaching and learning process within HEIs. This study points out the opportunities and challenges of using mobile devices to promote formal education, which will help chart a feasible route for implementing blended

mobile learning in Saudi higher education. The study gives a comprehensive view of students and lecturers' stance when it comes to their acceptance of blended mobile learning. In a unique way, this research delineates the inherent questions associated with mobile learning within higher education and shows the advantages of using mobile technology in a blended environment to enhance pedagogical development. Consequently, the implications of mobile technology for sharing information as well as improving communication for education are obvious. The knowledge garnered from this study is crucial for generating policies that will affect the implementation of technology within HEIs. Pedagogical approaches continue to evolve, and with the help of research, we can develop feasible pedagogy that focusses on solving current societal issues.

From a theoretical perspective, this study will add a deeper understanding and more knowledge to the literature. Moreover, it will provide additional information for researchers who are interested in adopting blended mobile learning, especially in light of the fact that it is a new concept in Saudi Arabia that requires more investigation and analysis. This study is considered one of the first to investigate blended mobile learning in depth. In particular, this study used UTAUT while adding academic social influence, facilitating conditions for academics, and habit as factors. This study highlights a huge gap between using mobile learning in everyday life and self-education on one hand and using mobile learning in formal education on the other. It demonstrates that the education system needs to evolve to suit a new generation that is familiar with mobile technology and has a strong habit of using it. This study found strong resistance to change amongst lecturers who oppose the students' demands for easier and more modern education that helps them develop their skills. Moreover, it illustrates some of the misconceptions surrounding the terms 'blended learning' and 'mobile learning' amongst students. These misconceptions could lead to the failure of blended mobile learning, because many students could avoid this model of education. Consequently, the misconceptions and avoidance could lead to the loss of many of the advantages of this model of education. The findings reveal the barriers facing its implementation, such as a lack of free internet connectivity in universities, trust concerns, high costs because it is dependent on a 'bring your own device' (BYOD) strategy, variability in features for the same reason, policy concerns, and lecturers' knowledge and resistance to change. This information could help decision-makers and

educators draw up appropriate plans to ensure that blended mobile learning is implemented successfully in Saudi higher education. The importance of this research has increased during the pandemic, because the suspension of traditional learning has given rise to the need for types of education that allow for physical distancing.

Implications for Other Stakeholders

Studies have been used to influence policy changes in different sectors. The knowledge from this study may affect the perspectives of different education stakeholders, such as lecturers, parents, universities, educational researchers, and governments. Lecturers will learn the importance of blended learning for improving their instructional strategies. Through technology, lecturers can ease their workloads while improving students' achievement and skill development. Parents will understand their role in improving the technological capacity of students. Coupled with parents, universities must embrace the changing world and integrate mobile technology within their institutions. Subsequently, the role of educationists and researchers is to improve on the recommendations made in this study.

Suggestions

1. Free internet access should be provided to students, and slow adopters should be provided with appropriate mobile devices.
2. Lecturers should adopt blended mobile learning, which increases student interaction and motivation.
3. Lecturers should be encouraged to use mobile devices in lecture halls and provided with appropriate educational workshops and other training sessions.
4. Awareness should be spread within society about the importance of mobile devices as learning tools that are useful for more than communication and entertainment.

Future Research

This study recommends that future studies should address the effects of mobile learning after experimenting with a formal educational experience for students and lecturers. As this study examined a number of acceptance factors, other factors that require further research emerged, such as hedonic motivation and the influence of norms and culture. The results indicates that students seek to increase their fun while

learning. Further research should evaluate the social implications of technology. It is prudent to widen the scope of this research. This study recommends that future studies could include proportional numbers of male and female students, as they are studied separately.

Appendices

Appendix 1: Approval Letter for Research Ethics from Brunel University, London



College of Business, Arts and Social Sciences Research Ethics Committee
Brunel University London
Kingston Lane
Uxbridge
UB8 3PH
United Kingdom
www.brunel.ac.uk

18 August 2017

LETTER OF APPROVAL

Applicant: Mrs Hanan Alsidrah

Project Title: Blended Mobile Learning in Higher Education

Reference: 7230-LR-Aug/2017- 8135-2

Dear Mrs Hanan Alsidrah

The Research Ethics Committee has considered the above application recently submitted by you.

The Chair, acting under delegated authority has agreed that there is no objection on ethical grounds to the proposed study. Approval is given on the understanding that the conditions of approval set out below are followed:

- The agreed protocol must be followed. Any changes to the protocol will require prior approval from the Committee by way of an application for an amendment.
- Please add the Brunel logo to the Participant Information Sheet.

Please note that:

- Research Participant Information Sheets and (where relevant) flyers, posters, and consent forms should include a clear statement that research ethics approval has been obtained from the relevant Research Ethics Committee.
- The Research Participant Information Sheets should include a clear statement that queries should be directed, in the first instance, to the Supervisor (where relevant), or the researcher. Complaints, on the other hand, should be directed, in the first instance, to the Chair of the relevant Research Ethics Committee.
- Approval to proceed with the study is granted subject to receipt by the Committee of satisfactory responses to any conditions that may appear above, in addition to any subsequent changes to the protocol.
- The Research Ethics Committee reserves the right to sample and review documentation, including raw data, relevant to the study.
- You may not undertake any research activity if you are not a registered student of Brunel University or if you cease to become registered, including abeyance or temporary withdrawal. As a deregistered student you would not be insured to undertake research activity. Research activity includes the recruitment of participants, undertaking consent procedures and collection of data. Breach of this requirement constitutes research misconduct and is a disciplinary offence.

A handwritten signature in black ink, appearing to read 'Tom Betteridge'.

Professor Thomas Betteridge

Chair

College of Business, Arts and Social Sciences Research Ethics Committee
Brunel University London

Appendix 2: Form Soliciting Agreement to Participate

<p>The study: Perceptions of Blended Mobile Learning among Lecturers and Students, Acceptance and Readiness In the Qassim University, Saudi Arabia</p>	<p>اسم الدراسة: المفهوم والقبول والاستعداد للتعليم النقال المدمج بين الأساتذة والطلاب في جامعة القصيم، المملكة العربية السعودية</p>
<p>It will be a pleasure if you volunteer to participate in this study.</p>	<p>من دواعي سروري أن تتطوع للمشاركة في هذه الدراسة.</p>
<p>Researcher: Hanan Alsidrah Principal Supervisor: Professor Michael Watts Supervisor: Dr. Sarmin Hossain Research Development Advisor: Dr. Gwen Ineson</p>	<p>الباحث: حنان السدرة المشرف الرئيسي: الأستاذ مايكل واتز المشرفة: د. سارمين حسين مستشارة تطوير البحث: د. قوين إنسون</p>
<p>How to contact the researcher? By email: Alsidrah.Hanan@gmail.com</p>	<p>كيف أستطيع أن أتواصل مع الباحثة؟ عن طريق البريد الإلكتروني: Alsidrah.Hanan@gmail.com</p>
<p>What is the purpose of the study? To investigate lecturers' and students' understanding of blended mobile learning, how to use mobile devices inside and outside the classroom, and how mobile devices can affect the learning process.</p>	<p>الغرض من الدراسة؟ للتحقيق في فهم الطلاب والأساتذة للتعليم النقال المدمج، وكيفية استخدام الأجهزة النقالة داخل وخارج الفصول الدراسية، وكيف الأجهزة النقالة يمكن أن تؤثر على عملية التعلم.</p>
<p>Why have I been invited to participate? This study focused on the lecturers.</p>	<p>لماذا تمت دعوتي للمشاركة؟ أساتذة جامعة القصيم هم المقصودين في هذه الدراسة</p>
<p>What are the possible disadvantages and risks of taking part? The risks of participating are the same as those experienced in everyday life.</p>	<p>ماهي المخاطر المحتملة للمشاركة في الدراسة؟ مثل أي مخاطر محتملة قد تواجهها في حياتك اليومية.</p>
<p>What data will be collected? Data will be collected from your responses to the questioner.</p>	<p>ما هي البيانات التي سنجمعها؟ نحن فقط نقوم بجمع إجاباتك على أسئلة الاستبيان.</p>
<p>What will we do with the data? The data will be analyzed for inclusion in a PhD study. The data can be accessed only by the researcher and her supervisor team (you can see their names are written above).</p>	<p>ماذا سنفعل بالمعلومات؟ سنقوم بتحليل المعلومات لإدراجها في رسالة الدكتوراه والذي يستطيع الاطلاع على إجاباتك ومعلوماتك فقط الباحث وفريق الإشراف الموضحة أسمائهم أعلاه.</p>
<p>Will my participation be confidential? Yes the identity data of the participants are confidential</p>	<p>هل ستكون مشاركتي سرية؟ نعم سنقوم بإخفاء هوية بيانات المشاركين</p>
<p>Can I get the study result? Yes when the study done the researcher can share and send you the study result, please contact with researcher and ask her.</p>	<p>هل أستطيع الحصول على نتائج المشروع البحثي؟ نعم تستطيع حين يتم البحث، تواصل مع الباحثة وأسألها أن ترسل لك النتائج.</p>

- I confirm that I have read and understand the description of the research project, and that I have had an opportunity to ask questions about the project.

- I understand that my participation is voluntary and that I am free to withdraw at any time without any negative consequences.
- I understand that if I withdraw I can request for the data I have already provided to be deleted, however this might not be possible if the data has already been anonymised or findings published.
- I understand that I may decline to answer any particular question or questions, or to do any of the activities.
- I understand that my responses will be kept strictly confidential, that my name or identity will not be linked to any research materials, and that I will not be identified or identifiable in any report or reports that result from the research, unless I have agreed otherwise.
- I give permission for all the research team members to have access to my responses.
- I give permission for the research team to re-use my data for future research as specified above.

- أؤكد أنني قرأت وفهمت وصف المشروع البحثي، وأنتي أتيت لي الفرصة لطرح أسئلة حول المشروع.
- أفهم أن مشاركتي تطوعية وان لدي الحرية في الانسحاب في أي وقت دون أي عواقب سلبية.
- أعلم أنه إذا قمت بالانسحاب، يمكنني طلب حذف البيانات التي سبق أن قدمتها، إلا أن هذا قد لا يكون ممكناً إذا تم بالفعل إخفاء هوية البيانات أو نشر النتائج.
- أفهم أنني قد أرفض الإجابة عن أي سؤال أو أسئلة معينة، أو القيام بأي من الأنشطة.
- أفهم أن إجاباتي ستبقى سرية للغاية، وأن إسمي أو هويتي لن يتم ربطها بأي مواد بحثية، ولن يتم التعريف بي في أي تقرير أو تقارير ناتجة عن البحث، ما لم أتفق على غير ذلك.
- أعطي الإذن لجميع أعضاء فريق البحث للحصول على إجاباتي.
- أعطي الإذن لفريق البحث لإعادة استخدام بياناتي للبحث المستقبلي كما هو محدد أعلاه.

I agree to participate in the research project as it described above

أوافق على المشاركة في المشروع البحثي كما هو موضح أعلاه

Thank you very much for your time and support.

شكراً جزيلاً على دعمك

Appendix 3: Participants' Personal Information Form

Name:

Chose name or nickname for this research:

Age:

Gender:

City:

Study level:

Your educational background:

The ability to own a mobile device:

Your background of using technology devices:

Annual income:

Do you have a job? If yes, please indicate

Appendix 4: Student Interview Guide

1. Do you have mobile device with internet connection? What type of your device you own?
2. Do you have an ability to download applications?
3. How many hours do you spend daily on your mobile device?
4. What apps do you use most?
5. Do you use you mobile device to learn something of personal interest? Give me examples
6. What type of information do you search for by your mobile device? Give me examples
7. Have you used your mobile device for learning something related to your academic work? Give me examples
8. Explain how you feel (ex: good/bad) about using your own mobile device to support your learning course?
9. What do you think about using your personal mobile device for communicating with your instructor or classmates? Have you done that before? How and Why?
10. Tell me how do you feel (ex: good/bad) about downloading apps for increasing your academic performance. Give me examples
11. Do you have any previous experience in using mobile device in classroom? Explain it if the answer is yes.
12. What is your opinion in using your mobile device in classroom with teacher guide?
13. What do you know about mobile learning? Blended learning? Blended mobile learning
14. In your opinion, how do mobile devices change the classrooms?
15. How do mobile devices effect the learning process?
16. How do mobile devices effect learners' motivations?
17. How do mobile devices effect academic achievement?
18. What device features would be important for using mobile device in classroom? Give me examples
19. What barriers may effect applying blended mobile learning? Give me examples
20. Do you have any information you would like to add?

Appendix 5: Sample Student Interview Transcript

Samar interview

Q1. Thank you for agreeing to make this interview.

(a) What name or nickname you prefer to use when I write your answers in my study?

S. Samar. My first name.

(b) How old are you?

S. 26 years

(c). You are a master student, right?

S. Yes. I am in the second year.

(d) What is your program?

S. Educational Technology

(e) Do you have a job?

S. Yes. I am a computer science teacher in secondary school

(f) Where are you from?

I am from Buraydah city.

Q2. (a) Do you own a mobile device with internet connection?

S. Yes. I have my own internet connection and every time I aim to leave home, I make sure my internet connection all set up. I used portable Wi-Fi device and some time I use 3G internet connection. There is no available free internet networks except in the college they provide a free network just for Master and Doctorate students. When I was undergraduate students, the internet was not available for students even in computer labs. We were working on desktop computers offline all the time so we were carrying our work with USBs after we finished the class.

(b) What type of mobile device do you own?

S. I am an Apple user. I have iPhone X and iPad.

(c) Do you have the ability to own a mobile device with internet connection?

S. Yes, I can.

Q3. Do you have the ability to download apps?

S. Yes.

Q4. How many hours do you spend daily on your mobile device?

S. 10 hours as I think. I count the hours that I listening things and the hours that I spent on watching videos.

Q5. What apps you are using in the most time?

S. I mostly use WhatsApp for communication with others, Twitter, Snapchat for shearing videos and photos with my friends and following the celebrities, Instagram for same reasons, Weather, Google Maps is important app for me, ibook for reading PDF files and ebooks, sound cloud for listening music, podcast where I follow a lot of useful channels, photo editing apps. And for shopping I used so many apps such as iherp, JD, jollychik. I use the bank apps, barcode reader and restaurant apps like Dominos Pizza and Hungerstation.

Q6. Do you use you mobile device to learn something of personal interest, tell me examples?

S. Yes, I learn about babies their health because I'm mother, I can meet other mothers by my small phones and shear information and our experiences and advices. I learn from makeup artist about makeup, fashion, who I follow in Twitter and Instagram, and learn about web sites designing from many blogs and forums.

Q7. What type of information you search for by using your mobile device? Give me examples.

S. for example health information, religion information, shopping offers and news and information about kids and things like that.

Q8. Have you used your mobile device for learning something related to your academic work? Give me examples.

S. Yes, I do learn about research, I have learned about Prezi and drobox for my assignments. That what I remember now.

Q9. Explain how you feel about using your own mobile device to support your learning course. For example good feelings, bad feelings....etc.

S. Very good feeling because my phone in my hand most the time for hearing, reading or watching things.

Q10. (a) What do you think about using your personal mobile device for communicating with your instructor or classmates?

S. It is a good idea and that is necessity specially to ask question or receiving additional information. For example, if the class is canceled or some ting we can know immediately.

(b) Have you done that before?

S. Yes. A lot of times actually.

(c) What for?

S. I communicate with lecturers and other Master students same my program to share resources and links, we have worked together on some projects and we know about seminars and conferences by mobile apps.

(d) How?

S. By using WhatsApp groups, Telegram groups, and sometimes by email.

Q11. Tell me how do you feel (for example. good feeling, bad feeling ... etc.) about downloading apps for increasing your academic performance. Give me examples.

S. Excellent feeling when the apps is free, useful, and in Arabic. I am not a good English speaker.

Q12. Do you have any previous experience in using mobile device in classroom? Explain it if the answer is yes.

S. I have used mobile device to share course materials with classmates and search about information during the class.

Q12. What is your opinion in using your mobile device in classroom with teacher guide?

S. In my opinion, it is a good idea for most classes.

Q13. What do you know about mobile learning, blended learning and Blended mobile learning?

S. Mobile learning is learn while mobility by mobile devices unlike traditional ways which by blackboards, books and teachers. In Blended learning there are teachers and technology devices is mix between technology and traditional learning. And Mobile Blended Learning is adding mobile devices into blended learning.

Q14. In your opinion, how do mobile devices change classrooms?

S. I think the classrooms will be modern, more active, may be it adding fun and exciting.

Q15. In your opinion, how do mobile devices change the learning process?

S. Learner will be active and positive inside classrooms. (How?) They will be able search and share information not just the teacher initiates student but all student can reach the information and knowledg.

Q16. In your opinion, how do mobile devices change learners' motivations?

S. Because the learner will use his own device inside classroom which he use all the day outside the school, he will be more comfort and his motivation will increase.

Q17. In your opinion, how do mobile devices change academic achievement?

S. I think it will increase the academic achievement if the student use it in a good ways.

Q18. What device features would be important for using mobile device in classroom?

S. Internet connection is the most important, easy apps fit the learners' level and ability, large memory capacity, big screen, and headphones. I think headphones will reduce the noise.

Q19. What barriers may effect applying blended mobile learning?

S. High coast of mobile devices and its accessories, small battery not enough for all classes materials. Although there are online storage now.

Q20. Do you have any information you would like to add?

S. No thank you I wish all the best.

Appendix 6: Students who participated in the Survey

	Name or Nickname	Age	Gender	Level of Study	Current Program
1	387	20	Female	Bachelor	Psychology
2	2018	34	Female	Master	Educational Administration
3	Abu Abdullah	38	Male	Master	Arabic Language
4	Abu Hatem	24	Male	Bachelor	English Language- Translation
5	Adale	19	Male	Bachelor	Psychology
6	Admin	20	Female	Bachelor	Psychology
7	Afnan	19	Female	Bachelor	Economy and Management
8	Afnan2	19	Female	Bachelor	English Language
9	Ali	19	Male	Bachelor	Preparatory year
10	Ammar	23	Male	Bachelor	Marketing
11	Atheer	20	Female	Bachelor	Computer Science
12	Ayed	29	Male	diploma	Business Administration
13	Bassam	22	Male	Bachelor	English Language
14	Batul	24	Female	Master	Educational technology
15	Bayan	24	Female	Master	English Language
16	Bayan2	25	Female	Post-BA Diploma	Mathematics
17	Boshra	20	Female	Bachelor	Pharmacy
18	Buthaina	25	Female	Master	Educational technology
19	Coach Siham.	24	Female	Post-BA Diploma	Mathematics
20	Faisal	27	Male	Master	Computer Science
21	Fatema	30	Female	Master	Educational technology
22	Fhad	20	Male	Bachelor	Psychology
23	Ghaida	20	Female	Bachelor	English Language
24	Ghena	26	Female	Master	Educational technology
25	Habab	25	Male	diploma	Teacher Training
26	Hadlen	36	Female	Master	Pharmacy

27	Haj	19	Male	Bachelor	Preparatory Year
28	Hamoud	24	Male	Bachelor	English Language
29	Hilah	23	Female	diploma	Office Management
30	Jamila	18	Female	Bachelor	Preparatory Year
31	Jas	18	Male	Bachelor	Preparatory Year
32	Jinan	26	Female	Master	Nutrition and food science
33	Khalid Mohammed	20	Male	Bachelor	Arabic Language
34	Lama	28	Female	Master	Educational technology
35	Lamia	23	Female	Master	Nutrition and food science
36	Lolo	22	Female	Bachelor	Mathematics
37	Lolo2	19	Female	Bachelor	Basic Education
38	Lubabah	24	Female	Post-BA Diploma	Teacher Training
39	Mariam	19	Female	Bachelor	Psychology
40	Marshed	30	Male	Master	Educational administration
41	Mohammed	22	Male	Bachelor	Business Administration
42	Mohammed 2	20	Male	Bachelor	Preparatory Year
43	Mohammed 3	22	Male	Bachelor	English Language
44	Mona	24	Female	Post-BA Diploma	English Language
45	Mora	40	Female	diploma	Marketing
46	Mother of Jojo	28	Female	Post-BA Diploma	Teacher Training
47	Nourah	35	Female	Master	Curriculum and Teaching
48	Nourah2	40	Female	Master	Educational administration
49	Nourah3	18	Female	Bachelor	Psychology
50	Peace	25	Female	Post-BA Diploma	Teacher Training
51	R	22	Male	Bachelor	Computer Science
52	Radhy	23	Male	Bachelor	Islamic studies
53	Raeid	21	Male	Bachelor	Computer Science
54	Raghid Mut	21	Female	Bachelor	Computer Science
55	Rakan	23	Male	Bachelor	Business Administration

56	Rashed	24	Male	Bachelor	Business Administration
57	Rawan	23	Female	Master	Educational technology
58	Robbie	21	Female	Bachelor	Computer Science
59	Saleh	22	Male	Bachelor	English Language
60	Saleh	21	Male	Bachelor	physics
61	Salem	30	Male	Master	Mathematics
62	Samar	20	Female	Bachelor	Nursing
63	Sarah	26	Female	Master	Holy Quran Sciences
64	Sekay	20	Male	Bachelor	physics
65	Shorouk	20	Female	Bachelor	Basic Education
66	ShoSho	21	Female	Bachelor	Business Administration
67	Sultan	24	Male	Bachelor	Law
68	Wafaa	23	Female	diploma	English language
69	Wijdan	23	Female	Bachelor	Mathematics
70	Wijdanah	25	Female	Bachelor	physics
71	Wissam	22	Male	Bachelor	Law
72	Zen	22	Female	Bachelor	Psychology

Appendix 7: Student Survey Questionnaire

- Do you have a mobile device connected to the Internet? If yes, what type of device is your device? (Mobile devices include smartphones and tablets such as mobile phones, iPads, iPods, smart watches, etc.)
- Do you have the ability to download applications?
- How many hours per day do you spend using your mobile device?
- What apps do you use most often? (You can mention any type of application)
- Are you using your mobile device to learn something that is personally interested in (not related to your studies)? Please write some examples
- What information are you looking for using your mobile device? Please write some examples
- Did you use your mobile device for anything related to your academic studies? Give me some examples
- Have you ever used application that helped you with your studies? How is that?
- How did you benefit from the university application?
- Did you use any application to help you in your study assignments? Describe it please
- Does your use of mobile phone facilitate your studies? How is that?
- What do you think about your use of your mobile device to communicate with professors and classmates?
- Have you communicated with the teachers using your mobile device in the past?
- How did you communicate with them? And for what purpose?
- Tell me how it feels (good, bad..) to use your mobile device to support your study materials? *
- Tell me how it feels (good, bad ...) to download apps to increase your academic performance, please write examples of some apps
- Do you have previous experiences using mobile devices in the classroom? Describe your experience if you answered yes

- What do you think of using your mobile device (as a study tool) in the classroom under the guidance of the professor?
 - In your opinion, should teachers and students make use of mobile devices in education? And how can they use mobile devices to support education
 - What do you know about mobile learning?
 - What do you know about blended learning?
 - What do you know about blended mobile learning?
 - In your opinion, how do mobile devices change classrooms?
 - How do mobile devices affect the educational process?
 - How do mobile devices affect students' motivation to learn?
 - How do mobile devices affect students' educational achievement?
 - What are the important features for using mobile devices in the classroom?
 - What are the obstacles that may affect the mobile blended learning adoption?
-

For your information:

Mobile learning: a learning method that allows the learner to access information anywhere and anytime by using mobile devices.

Blended Learning: A method of teaching that aims to help the learner achieve the intended learning outcomes, by combining F2F traditional forms of learning with e-learning to educate students inside and outside the classroom (Hassan 2010).

Blended Mobile Learning: An educational system based on the integration between F2F traditional learning and mobile learning for educational purposes inside and outside the classroom.

what activities you do on your mobile device

- Phone calls and messages
- e-mail
- News and surfing the Internet
- Social media (WhatsApp, Twitter, Instagram ...)
- Games or watching a video
- Download and read electronic books
- Write or take notes
- Search for information
- Use the camera to shoot and share photos
- Access to educational materials
- Shopping, ordering from restaurants, and ordering delivery
- Weather and Maps
- Other: _____

Do you have an email?

Can you connect to internet inside the university?

Do you use social media apps daily?

	Yes daily	3-4 days / week	2-1 day/ week	Rarely	No
What's App	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Snapchat	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instagram	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Facebook	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Twitter	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Telegram	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Google Plus	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Linkedin	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tumblr	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Line	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jodel	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pinterest	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Do you communicate with others through communication programs daily?

	Yes daily	Most of days	Rarely	No
What's App	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Snap chat	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instagram	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Facebook - Messenger	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Twitter	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jodel	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Skype	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tumblr	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Telegram	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Google Plus	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Are you a member of a group in one of the social media programs in:

- Whatsapp
- Instagram
- Snapchat
- Telegram
- Line
- Kakotok
- Twitter
- other:

The type of accounts you follow on social media apps

- Your friends, family and acquaintances
- Classmates
- Your teachers
- Teachers, professors, and educators
- Educational accounts that you can use in your studies
- Doctors or health accounts

- Fashion, fashion or makeup
- Sports or fitness coaches
- Trade or real estate
- News and information
- travel and tourism
- Awareness or advocacy accounts
- Languages or civilizations
- decor arts and design
- Celebrities sharing their diaries
- Ads, stores and marketing accounts
- Fun and games

Do you own a computer?

Finally, do you agree with the following:

The university encourages students to use modern technology

- I agree
- I somehow agree
- I somehow disagree
- I do not agree

There are facilities for using mobile devices inside the classrooms

- I agree
- I somehow agree
- I somehow disagree
- I do not agree

Lecturers encourage students to use their mobile devices for learning in the classroom

- I agree
- I somehow agree
- I somehow disagree
- I do not agree

Mostly I have internet on my mobile device for an hour or more everyday

- I agree
- I somehow agree
- I somehow disagree
- I do not agree

I have the skills to use my mobile device to learn

- I agree
- I somehow agree
- I somehow disagree
- I do not agree

If I want to use e-mail, I prefer to use a mobile phone more than a computer

- I agree

- I somehow agree
- I somehow disagree
- I do not agree

Mobile devices are very useful in the classroom

- I agree
- I somehow agree
- I somehow disagree
- I do not agree

Mobile devices increase cooperation between students

- I agree
- I somehow agree
- I somehow disagree
- I do not agree

Mobile devices A place to keep some study materials

- I agree
- I somehow agree
- I somehow disagree
- I do not agree

Mobile devices are very important to me for helping me to learning

- I agree
- I somehow agree
- I somehow disagree
- I do not agree

Social media apps are very important to help me in my learning

- I agree
- I somehow agree
- I somehow disagree
- I do not agree

The use of social media programs brings the lecturers closer to students in a beneficial way

- I agree
- I somehow agree
- I somehow disagree
- I do not agree

Mobile devices make the learning process faster

- I agree
- I somehow agree
- I somehow disagree
- I do not agree

Blended mobile learning helps solve the problem of individual differences between students

- I agree
- I somehow agree
- I somehow disagree
- I do not agree

Blended mobile learning is increasing creativity in students

- I agree
- I somehow agree
- I somehow disagree
- I do not agree

Mobile devices enable students to access a vast amount of data related to university classes

- I agree
- I somehow agree
- I somehow disagree
- I do not agree

I agree using my mobile device for education, for example, to search for information, exchange resources, or benefit from apps

- I agree
- I somehow agree
- I somehow disagree
- I do not agree

Do you have information you want to add?

thank you very much

Appendix 8: Lecturer Survey Questionnaire

1. Do you have mobile device with internet connection? What type of your device you own?
2. Do you have an ability to download applications?
3. How many hours do you spend daily on your mobile device?
4. What apps do you use most?
5. Do you use you mobile device to learn something of personal interest?
Give me examples
6. What type of information do you search for by your mobile device?
Give me examples
7. Have you used your mobile device for something related to your academic career? Give me examples
8. Does the using of mobile devices ease your career? How?
9. What do you think about using your personal mobile device for communicating with your students? Have you done that before? How and Why?
10. Tell me how do you feel (ex: good/bad) about downloading apps for teaching students. Give me examples
11. Do you have any previous experience in using mobile device in classroom? Explain it if the answer is yes.
12. What is your opinion of students using mobile device in classroom with your guide?
13. In your opinion, is lecturers adopting mobile learning in formal education? How they can capitalize mobile devices to support education systems?
14. What important skills lecturers and students need to have for adopting mobile learning in formal education?
15. How lecturers can be effectively trained to use mobile devices and its apps to advance and provide meaningful learning?
16. What things that makes you unwilling to adopt mobile learning in formal education?

17. What do you know about mobile learning? Blended learning? Blended mobile learning?
18. In your opinion, how do mobile devices change the classrooms?
19. How do mobile devices effect the learning process?
20. How do mobile devices effect learning strategies?
21. How do mobile devices effect learners' motivations?
22. How do mobile devices effect academic achievement?
23. What device features would be important for using mobile device in classroom? Give me examples
24. What barriers may affect applying blended mobile learning? Give me examples
25. Do you have any information you would like to add?

For your information:

Mobile learning: a learning method that allows the learner to access information anywhere and anytime by using mobile devices.

Blended Learning: A method of teaching that aims to help the learner achieve the intended learning outcomes, by combining F2F traditional forms of learning with e-learning to educate students inside and outside the classroom (Hassan 2010).

Blended Mobile Learning: An educational system based on the integration between F2F traditional learning and mobile learning for educational purposes inside and outside the classroom.

1) Are you using your mobile device for:

1. Communicate with your colleagues in the university
 Always Sometimes Infrequent Never
2. Communicate with other lecturers and educators form other universities in Saudi Arabia
 Always Sometimes Infrequent Never
3. Communicate with other lecturers and educators form other universities abroad
 Always Sometimes Infrequent Never

4. Communicate with current students
 Always Sometimes Infrequent Never
5. Communicate with previous students
 Always Sometimes Infrequent Never
6. Awareness of the systems, laws and requirements related to your academic career
 Always Sometimes Infrequent Never
7. Knowing the new events and news related to your academic career
 Always Sometimes Infrequent Never
8. Evaluation and monitoring of students participation
 Always Sometimes Infrequent Never
9. Sharing information with students
 Always Sometimes Infrequent Never
10. Inform students about academic tasks and answer their questions
 Always Sometimes Infrequent Never
11. Sending course materials to students
 Always Sometimes Infrequent Never
12. Make dialogues with colleagues and those with the same field
 Always Sometimes Infrequent Never
13. Creating relationships with academics for professional purposes
 Always Sometimes Infrequent Never
14. I conduct surveys and I collect data from my students
 Always Sometimes Infrequent Never

2) Do you agree with:

1. The university encouraged Lecturers to adopt new technologies
 Agree Somehow agree Somehow disagree Disagree
2. There are facilities for using mobile devices in the classroom
 Agree Somehow agree Somehow disagree Disagree
3. Students should be encouraged for using their mobile devices for formal education
 Agree Somehow agree Somehow disagree Disagree

4. Lecturers need more skills in using mobile technologies for academic work
 Agree Somehow agree Somehow disagree Disagree
5. Students need more skills in using mobile technologies for the academic work
 Agree Somehow agree Somehow disagree Disagree
6. Using social media make Lecturers close to the students in good ways
 Agree Somehow agree Somehow disagree Disagree
7. Mobile devices make learning process faster
 Agree Somehow agree Somehow disagree Disagree
8. Mobile learning make the classroom environment more interactive and fun
 Agree Somehow agree Somehow disagree Disagree
9. Mobile devices make the teaching easier
 Agree Somehow agree Somehow disagree Disagree
10. Mobile learning in formal education will help in individual deference between students
 Agree Somehow agree Somehow disagree Disagree
11. Mobile learning is increase students creativity
 Agree Somehow agree Somehow disagree Disagree
12. Mobile devices will make students accessing to high amount of information related to the course
 Agree Somehow agree Somehow disagree Disagree

Appendix 9: A sample of a coded sheet

How did you communicate with students by using mobile device?

- 1 I had used the **WhatsApp** application to communicate with students.
- 2 **WhatsApp** for receiving any question may the students have before the exam or to receive their assignments.
- 3 I usually send some announcements about the class and tasks through the use of **e-mail** and **blackboard** and I do that by using my mobile device.
- 4 By using **WhatsApp** and **email** - to answer the students questions outside lecturer halls.
- 5 Via **Whatsapp**
- 6 **WhatsApp** is what I used usually beside **Facebook**, **email**.
- 7 **Twitter + email**. And I used these apps for receiving assignments, answering their questions, or canceling the lecture.
- 8 **Email**, **Blackboard**, **WhatsApp**
- 9 I did that by using my smartphone apps such as **email**. To receive some questions and send weekly tasks
- 10 **Email** to answer questions and **Blackboard** as e-learning system for announcing, adding tasks and assignments, checking student progress, etc. As well I used **Virtual classes on the Bb instructor** app to hold meetings for graduation projects or for academic supervision.
- 11 Through my **Twitter** account and for sending educational information relating to the course.
- 12 **Twitter / email**.
- 13 Social media apps such as **Facebook**, **WhatsApp**, and **others**.
- 14 **WhatsApp** for sending and receiving files, set deadline dates, and keep in touch with students all the time.
- 15 By **WhatsApp**.
- 16 The **WhatsApp** is the way I had used for sending pictures and PDFs as that is facilitating the communication with all students outside the class and at anytime.
- 17 **Whatsapp**.
- 18 Through **Whatsapp** to communicate with students at anytime and anywhere.
- 19 I used **email / phone calls / communication** programs such as **WhatsApp**.
- 20 Through my email, for submitting assignments and research and receiving students permissions.
- 21 **Twitter** for example announcing lectures times and tasks.
- 22 **WhatsApp - Twitter**
- 23 Communicate and answer questions about the dates for submitting assignments, exams, and so on by using **social media apps**.
- 24 **MyU** program MyU mobile application. I put everything in it in a way that you can't imagine, my students are very happy with it and I respond quickly to their inquiries and it has privacy as well, in addition to downloading anything related to the material sometimes I forget to say something in the hall and come back to remind girls like deadline Or the location of a hall, or even if he is five minutes late for the lecture, give them news immediately.

Communication Tool	Number of Lecturers
WhatsApp	14
Twitter	5
Social media apps (57.5%)	Not specific 2
	Facebook 2
Email apps (25.0%)	10
The Blackboard app (7.5%)	3
Phone calls (2.5%)	1
Other apps (7.5%)	3

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