

School of Education
University of Leicester

Investigating Factors Influencing the Adoption of E-learning: Saudi Students' Perspective

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by

Khlood Rashed Al-Serehi Al-Harbi

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ABSTRACT

This research aimed at investigating the factors influencing students' intention to adopt e-learning as a supplementary tool (BIS) and for distance education (BID). A model based on the theory of Planned Behaviour (Ajzen, 1985) was developed in which the students' attitude (AT), Subjective Norm (SN) and Perceived Behavioural Control (PBC) were proposed as determinants of the students' behavioural intention to adopt e-learning (BI). The model hypothesised that gender and internet experience moderate the effects of these factors. The model also suggested some factors as antecedents to AT, SN and PBC. The study adopted a mixed methods approach, involving two small-scale qualitative phases and one major quantitative phase. The samples were drawn from students at a Saudi University. The results revealed that the model explained 20% of the students' BIS and 41% of the students' BID. Moreover, the results revealed that PBC, or the students' perceptions of the existence of constraints that can hamper their adoption of e-learning, was the most significant factor influencing their BIS and BID. Furthermore, for the adoption of e-learning to supplement the face-to-face study, SN or the students' perceptions of the social pressures put on them to adopt e-learning, was the second important factor influencing their decision, followed by AT. On the other hand, in the context of adopting e-learning for distance education, AT was more significant than the students' SN. In addition, gender was found to only moderate the link between PBC and BID. Internet experience was found to moderate the link between AT and BIS as well as the link between PBC and BID. The findings showed that e-learning perceived Ease of Use, Usefulness, Interactivity and Flexibility determined AT. The beliefs of the students' peers, family and instructors were found to shape their SN. Perceived Accessibility was the most significant antecedent of PBC, followed by Internet Self-Efficacy and finally, University Support. Moreover, the students did not show differences in BIS when they were compared, based on some selected demographics, while they showed differences in BID when they were compared on the same demographics. Semi-structured interviews were also conducted with six students to shed light on some of the results.

DEDICATION

For my beloved husband, mother and father

*“... though for myself alone
I would not be ambitious in my wish
To wish myself much better, yet for you,
I would be trebled twenty times myself”.*

William Shakespeare (The Merchant of Venice Act III, Scene ii)

In the midst of what is happening in the Arab world now (2011), I wish to express my sincere feelings and support to our people in Tunisia, Egypt, Libya, Yemen and Syria. May Allah bless our land and people with peace and prosperity.

*“If, one day, a people desire to live,
then fate will answer their call.
And their night will then begin to fade,
and their chains break and fall.
For he who is not embraced by a passion
for life will dissipate into thin air..”*

Abu Al Qasim Al Shabi, Tunisian poet, 1909-1934

This work is dedicated to you all.



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All praise due to Allah alone, I praise Him, seek His help and His forgiveness. I testify that there is no god but Allah and that Mohammed (Peace be upon him) is his messenger.

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ABBREVIATIONS AND TERMS USED

Acceptance	An individual's "psychological state with regard to his or her voluntary or intended use of" a particular technology (Gattiker, 1984, p. 56).
Adoption	"The process in which an individual comes to the decision to start using a new technology" (Vermaas & Van de Wijngaert, 2007).
BI	Behavioural Intention
BID	Behavioural Intention to adopt e-learning for distance education
BIS	Behavioural Intention to adopt e-learning as a supplementary tool
CMC	Computer Mediated Communication
DOI	Diffusion of Innovation Model
FB	Family's Belief
IB	Instructor's Belief
ICT	Information and Communication Technology
IE	Internet Experience
ISE	Internet Self-Efficacy
KAU	King Abdul Aziz University
LMS	Learning Management Systems
NCeDL	The National Center for e-learning and Distance Learning
PA	Perceived Accessibility
PB	Peer's Belief
PBC	Perceived Behavioural Control
PCI	Perceived Characteristics of Innovation model
PEOU	Perceived Ease of Use
PF	Perceived Flexibility
PI	Perceived Interactivity
PU	Perceived Usefulness
SN	Subjective Norm
TAM	Technology Acceptance Model
TPB	Theory of Planned Behaviour
TRA	Theory of Reasoned Action
US	University Support

1 CHAPTER ONE

BACKGROUND

1.1 INTRODUCTION

The new advancement in Information and Communication Technologies (ICT) has had an impact on several aspects of today's society. For the most part, commerce, politics and education have been undeniably influenced. Terms like the 'global village', 'information society' and 'knowledge society' symbolise the new realities and change in modern society. Numerous governments have taken serious steps towards preparing their citizens to become proficient cadres in dealing with the new requirements of the modern world. The appropriate use of ICT in education, such as the internet, helps to meet these new challenges by offering opportunities for better quality and efficiency. Education, facilitated by the new ICT or e-learning, can inevitably transform learning and instruction forms in ways "that extend beyond the efficient delivery or entertainment value of traditional approaches" (Garrison & Anderson, 2003, p. 2). For this reason, more and more educational institutions around the world are embracing e-learning systems and investing heavily in this sector.

In Saudi Arabia, the government has actively begun implementing e-learning initiatives within all the kingdom educational institutions and allocating a major amount of the national budget to this objective (National Center for e-learning and Distance Learning [NCeDL], 2009). However, despite the efforts exerted by the government represented in the initiatives of the Ministry of Higher Education (MoHE) and the NCeDL, the effective use of e-learning only occurs "when users choose to migrate or move from less efficient systems to relatively more advanced and more beneficial innovations" (Ndubisi, 2006, p. 572). Successful implementation of e-learning requires an understanding of the issues that promote the effective use of the technologies including technological, pedagogical, and individual factors (Jebeile & Reeve, 2003). In addition, investments in the infrastructure, staff IT training and content development may not be sufficient to ensure a successful adoption and use of e-learning (Ndubisi, 2004). Several scholars have highlighted that, understanding the factors that influence users' adoption and use of e-learning, is important for a better implementation and use of e-learning (Pituch & Lee, 2006; Selim, 2007). However, the lack of theoretical or conceptual frameworks in many past studies dealing with the adoption of e-learning system, resulted in inconsistent results and left the question of what constitutes the determining factors of the adoption and acceptance of e-learning, unanswered (Masrom, 2007). To this end, this research is concerned with the adoption of e-learning in the Saudi tertiary education sector, specifically by undergraduate students. Its main aim is to investigate the factors that influence the students' behavioural intention to adopt e-learning by proposing a model to explain behavioural intentions to adopt e-learning as a supplementary tool (that is, to supplement the traditional face-to-face lectures) and for distance education. This chapter sets the scene for this study. It will firstly introduce the

context of the study, Saudi Arabia and its higher education system. Moreover, the chapter will define e-learning. Subsequently, it will state the research problem, aim, objectives and questions. Finally, the chapter will conclude with the structure of the thesis followed by a summary.

1.2 THE STUDY CONTEXT: SAUDI ARABIA

This section offers an essential account of the context of the study. The geography, population and higher education in the country will be described. The rationale underlying this section is to help in understanding some of the issues that may impact on the students' attitude and perception regarding the adoption of e-learning.

Long (1997) illustrates a condensed, yet useful picture of the country and its people:

Saudi Arabia is a country of startling contrast- a huge land mass and small population; a barren desert terrain situated over great oil wealth; a traditional Islamic society undergoing rapid modernisation; a closed society that is often in news...the Saudis are a deeply religious, traditionally conservative, proud people who have been forced to make the transition from pre-industrial to the modern age in less than two generations....Saudi society is thoroughly Islamic and oriented to the extended family; bloodlines are ultimately more important than oil wealth (p. 1).

The fast pace of modernisation and economic development brought about by oil wealth, has noticeably altered several facets of the Saudi society. Nevertheless, the country has managed to keep its unique traditional way of life (Gazzaz, 2006). Long (2003) observes that, tribal and familial attachments of the Saudi society are proving resistant to the pressure of modernity. This context is a conservative society in which the family ties are very strong.

The major reason for the resilience of the traditional structure of the Saudi society, as some authors believe, is the remarkable strength of the Islamic values (Vassiliev, 2000). Even though some of the behavioural patterns of the Saudi society have undergone changes, these basic values are profoundly held and are not likely to change quickly over time (Long, 2003). Nonetheless, the modernisation process has led to positive consequences mostly observed in gender roles, the importance of education and new perspectives regarding jobs (Al-Farsy, 1990).

Saudi Arabia lies at the furthestmost part of South-Western Asia (figure 1-1). It covers the great bulk of what is known as the Arabian Peninsula, about 2, 25 million km² (868,730 m²). The country has long frontiers on the Red Sea to the west and the Arabian Gulf to the east. From the north, it is bordered by Jordan, Kuwait and Iraq and by Oman and Yemen from the south as well as by Bahrain, Qatar and the United Arab Emirates from the east.

Unexpectedly, the geography and climate of Saudi Arabia are varied. There are huge seas of sands such as the Rub al Khali or the Empty Quarter desert which covers more than 550,000 km² as well as the green mountains of Asir Mountains that reach as high as 3,000 m and the beautiful tropical sandy beaches along the west north and south areas. Nevertheless, the desert occupies the largest portion and stretches mainly over the middle, west and southeast. The climate is generally hot with an average temperature of 35.5 °C in the summer and 24 °C in winter. However, in the southern mountains and northern borders, it can reach as low as 0 °C in winter (Dew, 2003).



Figure 1-1: Location of Saudi Arabia

The country's geography and climate have posed challenges for the Saudi government in its development plans. For example, the country has a very modern highway network connecting almost all the country's major cities and regions. However, the very remote and scattered areas may only be reached via unpaved ways, either because of the rigid mountains or desertification. This gruelling environment has also influenced education. The government has made great efforts to provide educational opportunities for the citizens, especially primary and secondary education. Still, tertiary education is far less available to students residing in rural and remote areas, because the environment creates a major barrier (Al-Ghonaim, 2005).

The country's population in 2009 was estimated at over 28 million citizens with a natural growth rate of 2.6% per year (World Population Data Sheet, 2009). It is also useful to note that the median age of the Saudi population is estimated at 17.3 years, which means that one-half of the population is at or below the age of 18 years (The Saudi Eighth Development Plan, 2005-2009).

Amongst the challenges facing Saudi Arabia in its social and economic development, is the preparation of its citizens for life and work in a modern knowledge-based economy and knowledge-society (Information and Telecommunication Technology in Saudi Arabia, 2003). Saudi Arabia is trying to ensure that its need for a highly educated and trained national workforce to carry forward the future development is fulfilled. The Saudi government therefore devotes massive expenditure on education at all levels (MoHE, 2009).

When Saudi Arabia was founded in 1932, opportunities for education scarcely existed, being limited primarily to basic literacy teachings in mosques and *katateeb* (small Qur'an schools) (Yamani, 2004). In the 1930s, the first King of Saudi Arabia, King Abdul Aziz, initiated the educational development in the country by allocating vast resources to promote general and higher education. Education in Saudi Arabia is free for all citizens from pre-school through to university. The educational system provides instruction in various fields of modern and traditional arts and sciences. This diversity helps meet the country's growing need for highly educated citizens to build on its fast progress. The general education system started in the country in the 1930s. By 1951, there were 226 schools with 29,887 students (MoHE, 2009). Higher education began formally in 1957 by the establishment of the King Saud University in Riyadh. (Gazzaz, 2006).

Higher education in Saudi Arabia has undergone tremendous growth over the last four decades. The number of public universities in Saudi Arabia has boomed in the last three years. In 1998, there were only eight public universities, whilst in 2009, there were 25 universities (MoHE, 2009). Saudi universities are experiencing their "golden age" as described by Al-Ghonaim (2005), because they are being generously supported by the new government. The number of students enrolled in universities, public colleges and private colleges at the bachelor level, increased at an average annual growth rate of 6.7%. Female students constituted more than 69.5% of the total (The Saudi Eighth Development Plan, 2005-2009).

Despite the achievements and progression of the Saudi higher education systems, the country's higher education institutions face some challenges as a result of demographic, economic and social factors (Al-Ghonaim, 2005). These challenges have exerted pressure on the absorptive capacity of the institutions, as well as the internal and external efficiency system (The Saudi Eighth Development Plan, 2005-2009).

As mentioned above, the population growth rate is high. The young sector of the population is expected to enrol and graduate from the general education system over the coming years. According to the Eighth Development Plan, the number of entrants to the universities is expected to increase to more than 164,000 by the end of 2009. As such, there will be huge demands for higher education in the country. According to Al-Harbi (2002), there is serious overcrowding in Saudi universities.

Furthermore, the growing importance of knowledge, referred to as, 'knowledge economy' and the 'knowledge society' is also exerting further pressure on the Saudi tertiary educational systems as an active factor in qualifying and preparing future cadres. To address these demands, the MoHE has raised the absorptive capacity of higher education institutions to 70% and 85% (Al-Harbi, 2008). However, this may impair performance and exacerbate student/staff ratios (Al-Sultan, 2005). The Ministry of Higher Education has also supported the establishment of private universities. For instance, the number of private universities reached 5 institutions and more than 32 colleges in 2009 (MoHE, 2009).

However, Al-Ghonaim (2005) contends, “with the crisis in the global economy, increasing university capacities by expanding existing colleges and universities is no longer possible. The current resources of the institutions of higher education are not enough to offer Saudi students, male and female, a good education[sic]” (p.4). In light of this situation, other educationalists call for a more innovative form of higher education, such as distance education and e-learning (Al-Arfaj, 2001).

1.2.1 KING ABDUL AZIZ UNIVERSITY

In 1967, the King Abdul Aziz University was founded in the western part of Saudi Arabia, initially as a private University and it then became a State University in 1971. The University started its first year in 1968 by inaugurating preparation study programmes with only 68 male students and 30 female students. A year later, the University inaugurated its first College (the College of Economics and Management) following which, the College of Arts and Human Sciences was established in the subsequent year (King Abdul Aziz University, 2007). At present, the number of students amount to 82,152 male and female students. The University has witnessed much development in quality and quantity since it was established, to the extent that, it is now one of the distinguished Universities in terms of the number of students, the number of scientific and theoretical fields of study and the exclusiveness of certain specialisations such as Sea Sciences, Geology, Nuclear Engineering, Medical Engineering, Meteorology, Aviation and Mineralisation. King Abdul Aziz University is a pioneer in offering higher education to Saudi women and the female and male sections were inaugurated in the same year.

The University not only has regular student programmes, but also external programmes to make it easy for all students to obtain higher education. It also established the Deanship of Distant Teaching to cope with the development in learning and teaching technology (King Abdul Aziz University, 2007). Having introduced the context of the study, the second section of this chapter will provide a review of e-learning to offer a better understanding of the research topic.

1.3 E-learning

1.3.1 DEFINING E-LEARNING

The ‘e-’ in e-learning is “a prefix that stands for ‘electronic’ and refers to information technologies, business, and almost anything connected to or transmitted over the Internet” (e-, The American Heritage New Dictionary of Cultural Literacy, n.d.). This relatively new prefix is also found in several other terms such as e-commerce, e-business, e-shopping, e-banking, e-book, e-administration and e-mail, and signifies the penetration of the technology into our lives.

The term e-learning was first coined by Jay Cross in 1998 (Cross, 2004). However, other terms such as tele-learning (Collis, 1996), telematics (Selinger &

Pearson, 1999), web-based learning (Lockwood & Gooley, 2001), on-line learning (Salmon, 2000), web-based instruction and flexible learning (Khan, 1997, 2007), web-enhanced learning (Kirschner & Paas, 2001), networked collaborative e-learning (McConnell, 2004) and integrated e-learning (Jochems, Merrienboer, & Koper, 2004) have also been used to refer to the same concept. In fact, the literature on e-learning is very extensive, which makes defining the term a rather intricate task. Indeed, there is no common definition for e-learning according to Dublin (2003) and Oblinger and Hawkins (2005). Dublin notes that one of the myths about e-learning is that, “everybody knows what you mean when you talk about e-learning; however, the term e-learning means different things to different people” (2003, p.2).

Nevertheless, upon looking at the various definitions of e-learning below, two perspectives can be noticed. Some scholars emphasise the central role of technology. For example, Rosenberg (2001) states that, e-learning involves the utilisation of internet technologies to deliver learning opportunities. Some writers, such as Urdan and Weggen (2000), even extend the range of technology encompassed in e-learning to include audio/video tapes, CD ROM, TV and radio. Recently, this definition has been further extended to embrace mobile and wireless learning applications (Wagner, Hassanein, & Head, 2008).

However, Garrison and Anderson (2003) and Rosenberg (2001) take the view that, e-learning is only networked or involves using the internet and thus exclude other technologies, because unlike the internet, these technologies are not capable of “instant updating, storage/retrieval, distribution and sharing of instruction or information” (Rosenberg, 2001, p.28). E-learning is simply, “learning on Internet time, the convergence of learning and networks” (Cross, 2004, p.104).

On the other hand, some scholars employ a broader definition of e-learning. For instance, Khan (2005) defines e-learning as, “an innovative approach for delivering a well-designed, learner-centred, interactive, and facilitated learning environment to anyone, anyplace, anytime, by utilising the attributes and resources of various digital technologies along with other forms of learning materials suited for open, flexible, and distributed learning environment” (p.3). McConnell (2006) refers to e-learning as, ‘networked collaborative e-learning’ and defines it as “the bringing together of students via personal computers linked to the internet, which focus on them working as a ‘learning community’, sharing resources, knowledge, experience and responsibility through reciprocal collaborative learning” (p.11). Evidently, this second perspective goes beyond the technology element of e-learning and attaches another deeper level, namely that of the learning theory. Khan (2005) argues that, e-learning is essentially a learner-focused model and stresses interaction. In the same vein, McConnell (2006) places emphasis on networking people and resources. For McConnell, e-learning is learning in virtual or networked groups and communities. This view of e-learning suggests collaborative learning where the students share, cooperate, provide support and engage in relevant and meaningful processes. The emphasis is emphatically on ‘learning’ and not on the technology as such (McConnell, 2000).

Whilst the first perspective of e-learning emphasises the use of technology mainly as a delivery system and that therefore, any educational philosophy can be applied (Nichols, 2003), the second stance maintains that the role of technology to support learning is dependent on how learning is conceived. For example, if learning is primarily seen as the acquisition of knowledge from books, then the technology will be used to present the information. If learning is conceived as occurring through interaction and collaboration, the technology will be exploited to facilitate communication between the students and their instructors (Inglis, Ling, & Joosten, 1999). This is why Nichols (2003), in his attempts to formulate an e-learning theory, rejects the idea of e-learning as a distinct mode of education and refuses juxtaposing it with face-to-face or even distance education. He argues, that e-learning is rather a means that can be used in both environments and that, “Skinner’s behaviourism, Piaget’s cognitive constructivism and Vygotsky’s social constructivism can all be facilitated through e-learning” (p.3). However, most of the pedagogical principles that underpin e-learning, as envisaged by scholars such as Khan, McConnell and Garrison and Anderson, are those of constructivism. Constructivism places importance on the social construction of knowledge, the context of learning, collaboration and a learner-centred approach (Weller, 2002).

In the context of this study, e-learning can be defined as the facilitation of learning through technology; in particular, internet technology. In essence, e-learning in this research refers to the use of the internet as either a resource utilised by the students to aid their study or as a means for delivering distance learning courses. Other technologies such as the computer, CD...etc, that have been used and integrated into the higher education system in Saudi Arabia since the early 1970s (Al-Sultan, 2005) are not implied in our definition of e-learning. This is mainly because the earlier technologies lack an essential element of the educational process, that is, interaction (Angeli et al., 2003). The unique and powerful features of the internet not only facilitate transmitting information flexibly, but also allow effective multi-way communication as well as learners’ support. In Saudi Arabia, the internet diffusion in education is recent, yet, very promising (Bates, 2009) unlike earlier technologies. Our definition of e-learning is thus very similar to that of Garrison and Anderson (2003) and Rosenberg (2001).

1.3.2 EMERGENCE OF E-LEARNING

The history of e-learning is relatively short and recent, yet its development is rapid. This history runs parallel with the advancement in computers and the internet. If the scope of technology in e-learning is extended to include any electronic devices, then examples of e-learning exist as early as 1910, with the first instructional film being produced and, in 1920, with Sydney Pressey’s testing machine (Holmes and Gardner, 2006). Pressey’s machine was an educational device that offered drill and practice exercises, and multiple-choice questions for the students (figure 1-2).

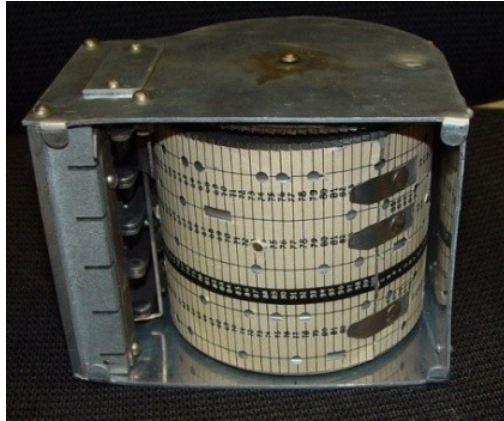


Figure 1-2: Pressey Testing Machine

However, the prevailing views of e-learning only associate it with computers and network technology. Thus, the first true example of e-learning, as some scholars argue, has appeared at the same time that a computer has become practical for personal use (Aranda, 2007). The computer was first applied in education during the 1970s. For example, the PLATO Project (figure 1-3) was the first generalised computer assisted instruction system that was developed by the University of Illinois (Woolley, 1994). It incorporated course materials into larger interrelated conceptual packages (Van Meer, 2003).



Figure 1-3: A PLATO V

However, the interconnectivity supplied by the internet and the massive resources provided by the World Wide Web, have distinguished e-learning. The first internet-based courses emerged in the 1980s. For instance, the University of Sussex launched Poplog, an interactive learning environment for computing students. The system contained hyperlinked teaching materials, an extensible text editor, multiple programming languages as well as interactive demonstrations (Sloman, 1989). Similarly, in 1988, the Open University employed a conferencing system (CoSy) to use in its popular course, 'An Introduction to Information Technology: Social and Technological Issues' (Mason, 1991). Soon after, with the presence of the World Wide Web during the 1990s, web-based education started to appear (Bates and Poole, 2003). In 1989, for example, Lancaster University launched a Masters programme in

Information Technology and Learning, taught using virtual learning methods (Goodyear, 1996). Today, e-learning has grown into “a globally accepted, even necessary mode of delivery in most educational institutions” (Brown, 2003, p.3). As an example, Web-based Learning Management Systems such as WebCT, Blackboard and others are already widely employed around the world. Moreover, advancements in ubiquitous computing (for example, wireless) and mobile computing (e.g. PDAs) are accelerating and expanding the potential of e-learning (Holmes & Gardner, 2006).

1.3.3 DIMENSIONS OF E-LEARNING

E-learning can take many forms and is often associated with the environment on which the course is based. E-learning can take place in either an asynchronous or a synchronous setting. An asynchronous environment is characterised by the delay in the communication time between learners and instructors. On the other hand, a synchronous communication environment takes place in real time in which learners and instructors are all communicating simultaneously, but not necessarily in the same location (Jolliffe, Ritter, & Stevens, 2001).

At the micro end of the e-learning continuum, e-learning can be used to supplement face-to-face education, in which activities and information resources are used as components of what is known as blended learning. Blended e-learning involves elements of internet interaction and face-to-face interaction. For example, the instructor can use flash simulations to visualise concepts during traditional lectures. At the macro end of the continuum, there can be complete distance e-learning programmes and virtual universities (Khan, 2007). Moreover, e-learning applications can differ in the levels of collaboration that they incorporate. Some programmes are totally independent and individual, whilst others involve elements of group learning, such as discussion forums or chat rooms (Wagner et al., 2008).

1.3.4 POTENTIAL AND LIMITATIONS OF E-LEARNING

The different modes of education such as distance education, part-time study, evening schools and remedial literacy schools¹ have been offering educational opportunities, along with traditional face-to-face education. With the advent of the internet, the possibility of offering education on a scale far more reaching than previously imaginable, is now promising. E-learning, empowered by the internet’s massive resources and flexible and interactive means of communication, allows students to pursue educational opportunities from their homes or workplace (Holmes & Gardner, 2006). The potential of e-learning can essentially be summarised in three advantages: flexibility in delivery, enabling communication and effective education. The following section elaborates on these features and discusses the implications for Saudi students, as well as raises the challenges associated with these aspects to balance the argument.

¹These are free schools established by the government to educate old illiterate people in Saudi Arabia.

1.3.4.1 Flexibility in delivery

One of the major limitations of traditional face-to-face education is that it is confined by a limited time and location and hence requires the immediate physical existence of students and instructors, as well as the learning materials. This rigidity makes it impossible for some types of learners, such as disabled people or workers to benefit from this closed form of education. The internet is device, platform, time and place-independent (Khan, 2007). Building on this powerful technology, e-learning transcends the temporal and geographical barriers and offers learning anytime and anywhere. As Al-Ghonaim (2005) put it, “students can log on to their courses at any time of the day or night, and have access to lectures, course materials, and class discussions” (p.48). The students can access not only the course materials, but also a massive amount of information from the internet useful for their studies at anytime and from anywhere. Another important advantage of this flexibility in scheduling learning to meet the needs of the learners, is the encouragement of lifelong learning (Porter, 1997). Similarly, e-learning, with the aid of adaptive technologies such as screen-readers, can provide disabled people with access to education.

As described above, in a country with a vast terrain such as Saudi Arabia, students residing in rural and remote areas face challenges to pursue tertiary education. Acquiring education is further hindered by the absence of reliable transport and mail systems (Al-Arfaj, 2001). The Saudi government has provided general education including primary, secondary and ‘adults eradicating illiteracy’ schooling to almost all distant areas (Al-Salloom, 1995). However, higher education institutions are mainly located in the large urban regions. Hence, moving to these regions is the only way for those students to get post-secondary education. E-learning, as a flexible mode for delivering education, can benefit these groups of students since they do not need to commute long distances or move altogether to urban regions.

However, since e-learning is reliant on the internet, access to the technological resources is indispensable to obtain the advantage of e-learning flexibility. Lack of access for economic or logistical reasons will prevent students from accepting or using e-learning. Educators and researchers, often enthusiastic about implementing e-learning, make the mistake of believing that all students have access to an e-learning environment (Lynch, 2002). On the contrary, internet accessibility is not widespread in many countries. Unfortunately, the digital divide between those who have access to the innovative technologies and their applications, and those who lack this access is still wide, particularly in the developing countries (Henderson & Stewart, 2007). Obtaining an internet connection still conjures images of expenses, even in the more developed countries such as the European countries (Lynch, 2002). With the less developed telecommunication infrastructure in many other countries in Asia and Africa, the situation is intensified (Feng & Mac, 2004). In many instances, internet access costs users a considerable amount of money especially if they are charged for the time spent online. If a students’ online usage is limited by the amount of internet access they can

afford, then the student may not accept or use e-learning (Al-Ghonaim, 2005; Henderson & Stewart, 2007).

Moreover, access to flexible e-learning may be threatened by the technical problems associated with computers and the internet itself. This can happen at any stage of using e-learning, starting from the malfunction of the computer itself, to problems with the website being accessed. Research has shown that, the technical problems facing the students lead to frustration and eventually, to drop out (Lynch, 2002). Another major problem affecting e-learning which stems from the internet, is the infection of malware. Malware is a broad term that includes viruses, spam, phishing and other means of taking control of the digital devices without permission, is growing rapidly and exerts a negative influence over the cyberspace (Weippl, 2009). Thus, constant and reliable access to e-learning resources is the basis on which successful e-learning is built.

Furthermore, the flexibility of e-learning stems from the absence of any physical existence or temporal commitment, i.e. the instructors and students do not need to be available in the same place or at the same time. In view of such independence, the students decide where and when they want to study (Khan, 2007). This requires greater dedication and discipline than in a traditional environment (Pollard & Hillage, 2001; Al-Saif, 2005). Clarke (2004) suggests some characteristics of a successful e-learner: confidence; a positive attitude to learning; being self-motivated to succeed; having effective communication skills; an ability to collaborate and co-operate with other learners and being a confident user of ICT. However, the traditional face-to-face, teacher-centred learning has a long tradition in academia, thus it challenges the self-directed e-learning as Khan (2007) argues. There are also the students who are less self-dependent and more teacher-dependent (Diaz & Cartnal, 1999). As a result, e-learning may not prove effective for those students, as they are accustomed to and prefer traditional learning contexts (Al-Saif, 2005).

1.3.4.2 Enabling communication

E-learning includes a range of powerful means and interactive capabilities that support a sophisticated range of communication (Ryan, Scott, Freeman & Patel, 2000). Since communication is at the heart of all forms of education, Garrison and Anderson (2003) expect the impact of e-learning on education to be significant, stating: “E-learning will inevitably transform all forms of education and learning in the twenty-first century...as we gain a better understanding of its potential and strengths, e-learning will effectively transform how we approach teaching and learning” (p.2). They note that e-learning’s value is not only in its ability to allow access to a huge amount of information, but also in its communicative and interactive capabilities.

One of the advantages of communication enabled by e-learning or Computer Mediated Communication (CMC) is the ability to bring together two previously seemed paradoxical concepts, independence and collaboration (Garrison & Anderson, 2003). The transformational power of e-learning quoted above by Garrison and Anderson

(2003), is propelled by this capability of blending independence and interdependence. Learner independence in terms of space and time gained by distance education is often accompanied by a loss of collaboration and increased isolation. E-learning can support synchronous and asynchronous communications in various formats ranging from text, voice and video, which means connecting people in personal and public ways and so nurturing both independence and social interdependence simultaneously (*ibid.*).

In addition, this communication is not only confined to the local level, but can also be easily and unprecedentedly extended to the international level, creating opportunities for cross-cultural knowledge development (Al-Saggaf & Williamson, 2004). For example, a Saudi instructress can establish a discussion group for her female students on any topic and invite participation from other places to broaden and enrich the discussion without the need to leave the country or physically mix in a sex-segregated environment such as Saudi Arabia.

Another advantage of CMC is the relative anonymity it affords. This ‘liberating’ feature is useful for shy people or people with a speech impediment. Nevertheless, it can also disempower others, for example, those who suffer from writing and reading problems such as dyslexia (Weller, 2002).

Communication in e-learning, on the other hand, may suffer from some drawbacks. For instance, it lacks some of the essential cues of face-to-face communication such as facial expressions, body language and voice tones (Weller, 2002). Nonetheless, the advancement in e-learning tools (e.g. web-cams, video-conferencing) has offered parallel experiences to the face-to-face environments. In addition, there are techniques which have been developed amongst internet users to compensate for such deficiencies, such as the emoticon and font type. However, the lack of face-to-face interaction between the students and the instructors may be seen as cold and impersonal, thus unsuitable for some types of learners (Pollard & Hillage, 2001).

1.3.4.3 Effective learning

E-learning can create successful learning environments that motivate the students and facilitate meaningful and worthwhile learning activities and outcomes (Garrison & Anderson, 2003). As discussed above, e-learning can offer powerful tools for communication. In addition, Garrison and Anderson (2003) argue that, the text-based form of e-learning communication, such as that generated from e-mail messages or discussion threads, has special attributes that can facilitate critical discourse and reflection. In a study on questioning and cognitive functioning, Blanchette (2001) found that, interaction in online environments is more intellectually demanding than face-to-face contexts. As there is ample time for the students to reflect and focus, teachers can ask higher level written cognitive questions. In fact, writing, as Ong (1995) claims, “intensifies the sense of self and fosters more conscious interaction between persons” (p.179). However, as mentioned above, when discussing CMC, such text-based

communication may not appeal to some students and thus relying solely or heavily on this type of communication, may not be fruitful in all situations.

In addition, in an e-learning course, using stimulations created by software, such as Shockwave and Flash, can support the cognitive work of analysing data, visualising concepts and manipulating models (Khan, 2007). Moreover, using the rich resources of the internet, such as the virtual libraries and museums, develop the students' understanding and enrich their educational experiences (Weller, 2002; Clarke, 2004). E-learning can also accommodate individual learning styles. For example, a student may prefer a text-based form, while other students or the same student, but at other times, may prefer visuals or kinaesthetic activities (Inglis et al., 1999).

However, such powerful capabilities entail high technological requirements such as large bandwidth and specialised software. More importantly, a successful e-learning course requires a sound design and this, as Jones and Farquhar (1997) note, can be extremely difficult. A "poorly designed e-learning course can be just as rigid and dogmatic and non-interactive as a poorly taught face-to-face course" (Khan, 2007, p.4).

1.4 RATIONALE FOR THE RESEARCH

In this digital age, computers and internet technology have a steady presence in higher education. A growing number of tertiary institutions and universities have been enhancing their programmes with e-learning systems (Fung & Yuen, 2005). However, the potential benefits of e-learning as aid to teaching and learning may not be fully achieved as a result of poor adoption by users (Liaw, 2002b; Fung & Yuen, 2005; Huang, Wei, Yu, & Kuo, 2006), and "without the real user acceptance, the implementation of the new technology will be difficult" (Huang et al., 2006, p. 1). Moreover, there has been a mistaken belief in the success of internet technology that, "build it and they will come" (Patel & McCarthy, 2000). In fact, as Byrne (2002) notes, having the technology available and accessible do not automatically mean that, "people will find it useful, find it easy to use, or even find it at all" (p. 62). Users are sometimes reluctant to accept and use available technologies and show little interest in trying innovative technology, even if the technology may offer them better solutions or advantages (Liaw, 2002b). Fung and Yuen (2005) stated that:

Since the ultimate goal of using e-learning system is the enhancement of effective learning, the benefits of the system cannot be achieved if student adoption rate is low. Thus, it is necessary for education providers to understand how students perceive the technology and their concerns in order to find out the crucial factors influencing student adoption (p.14).

Therefore, it is crucial for education providers to find out the key factors influencing the students' adoption of e-learning, that is, why students decide on using or rejecting an e-learning system when they have a choice. This information would help developers build

systems that potential users want to utilise, or find out why they avoid an existing system (Mathieson, Peacock, & Chin, 2001; Ghamatrasa, 2006).

Although wide-ranging research has been carried out on implementation issues pertinent to e-learning design, development, management, delivery, evaluation and operations (Lee, Driscoll, & Nelson, 2004), nevertheless, research on the individual-level factors that influence the users' adoption of e-learning has rarely been conducted (Masrom, 2007; Park, Lee, & Cheong, 2007; Lim, Hong, & Tan, 2008). Garrison and Anderson (2003) observed that:

Considering the massive adoption of e-learning, what is surprising and cause for concern, is that we know so little about the use of this medium to facilitate learning...To date, published research and guides consist of innumerable case studies and personal descriptions and prescriptions but little in the way of rigorous, research-based constructs that lead to an in-depth understanding of e-learning in higher education (p. xi).

In particular, there is little empirical research that has attempted to build a theoretical model to explain technology adoption by the students (Park et al., 2007). There is therefore a need for a model that can be used to identify the factors that affect the students' acceptance and adoption of e-learning (Davis & Wong, 2007). Furthermore, much of the research on the adoption of internet-based technologies in education has largely focused on instructors and administrators rather than students, even though the students play a key role in the diffusion dynamics of e-learning systems (Henderson & Stewart, 2007). Thus, this research focuses on the students. Understanding why the students adopt or reject e-learning will help to create a more favourable environment for greater adoption, as well as help to design strategies to promote acceptance (Ndubisi, 2004). Predominantly, when a new system is introduced, a greater understanding of the factors affecting its adoption, will lead to an improvement of training, education, implementation and acceptance. Likewise, careful consideration of the factors affecting e-learning adoption is important to ensure that user satisfaction is obtained and investments warranted (Vitartas, Jayne, Ellis, & Rowe, 2007). Thus, the objective of this research is to understand the factors that affect the students' adoption of e-learning as a supplementary tool and for distance education.

Moreover, the overwhelming majority of the studies have been conducted on users in developed countries, particularly in the USA and Europe; only a few have been conducted in the developing regions of the world (Fusilier & Durlabhji, 2005; McCoy & Everard, 2000; Dirani & Yoon, 2009). Nonetheless, there is no basis to conclude that findings from developed countries may be applicable to other regions (Abouchdid & Eid, 2005).

As mentioned in the introduction, the Saudi context has unique features. Islam acts as a major force in determining the Saudi culture. That is, it plays a major role in defining the norms, traditions, responsibilities and practices of the society (Al-Saggaf, 2004). For instance, the segregation of the sexes is one of the distinctive characteristics

that deeply shape numerous facets of public and social life in Saudi Arabia. This means that women should not mix with unrelated men unnecessarily (Al-Munajjed, 1997). This segregation between the two genders is a rule that applies to education, hospitals and recreation. This is additionally manifested in the ban on women driving in the country which constitutes a major hurdle in the way for them to continuing education. Moreover, the tribal structure of the Saudi society, that is still very strong in many areas, restricts some behaviours, that are regarded as natural in the West, such as talking with non-relative males without necessity, even in the cyberspace (Al-Saggaf, 2004). In addition, other characteristics such as shyness and decency are highly regarded and encouraged in the Saudi society for both men and women alike. Furthermore, in this tribal and religious society, family ties are very strong and there are responsibilities towards the family that should be taken seriously by all the family members. As such, the conclusions from other studies in the more liberated countries may not be generalizable to the more conservative Saudi environment. Thus, there is a great need for more research in this contexts for a better understanding of the adoption process as well as for comparison purposes. In view of that, the current study seeks to shed light on the acceptance of e-learning in Saudi Arabia and enrich the literature on ICT adoption with studies from Arab countries.

Upon reviewing the relevant literature, as far as the researcher is aware, there has been no published model of technology adoption focused on e-learning adoption by Saudi students. Accordingly, this research aims to fill this gap and enrich the literature with information from the Saudi context. Within the Saudi context, little work has been done to research e-learning from the students' perspective (Al-Ghonaim, 2005). Only two studies (Al-Arfaj, 2001; Nehari Talet, 2007) were located that looked at e-learning and the samples were from students in the tertiary education. Al-Arfaj (2001) was concerned with investigating college students' perceptions of distance web-based instruction. However, his research only focused on the effect of three demographics on the students' perception, namely, gender, experience and college of study. The study did not examine further factors that might influence the students' perception. Likewise, Nehari Talet (2007) focused on ascertaining the Saudi students' perception of the benefits and the efficient use of online teaching and learning (OTL). However, the sample of this study is rather unrepresentative because it has only included male vocational colleges students and the study was only descriptive. In an attempt to address this research lacuna, the current study investigates the factors that influence the tertiary level students' behavioural intention to adopt e-learning as a supplementary tool and for distance education. It is hoped that this research will provide significant information to promote the successful implementation of e-learning in Saudi Universities.

1.5 RESEARCH QUESTIONS AND OBJECTIVES

Given the relative novelty of e-learning, and since the ultimate objective of using e-learning systems is the enhancement of effective learning, the potential of using e-

learning cannot be realised if the students' adoption rate is low. Therefore, this research seeks to answer the following question:-

What are the underlying factors that influence the students' intention to adopt e-learning as a supplementary tool and for distance education within the Saudi higher education context?

This question is further decomposed into four sub-questions:

- 1. Does the research conceptual model with its proposed factors explain the students' behavioural intention to adopt e-learning as a supplementary tool and for distance education?*
- 2. Does gender and internet experience moderate the relationships between the three proposed determinants of behavioural intention (Attitude, Subjective Norm and Perceived Behavioural Control) and behavioural intention to adopt e-learning as a supplementary tool and for distance education?*
- 3. Do the three proposed determinants of behavioural intentions to adopt e-learning (Attitude, Subjective Norm and Perceived Behavioural Control) mediate the relationships between their respective salient beliefs and behavioural intention to adopt e-learning as a supplementary tool and for distance education?*
- 4. Do the students differ in their behavioural intention to adopt e-learning as a supplementary tool and for distance education based on selected demographics?*

The study sets four objectives to answer the research questions:

- To propose and assess a conceptual model to explain the University students' behavioural intention to adopt e-learning as a supplementary tool and for distance learning.
- To assess the moderating effect of gender and internet experience on the relationships between attitudes, Subjective Norm, Perceived Behavioural Control and behavioural intention.
- To assess the mediating effects of attitude, Subjective Norm, and Perceived Behavioural Control on the relationship between their salient beliefs and behavioural intention.
- To compare between the students in their behavioural intentions to adopt e-learning as a supplementary tool and for distance learning based on selected demographic variables.

1.6 STRUCTURE OF THE THESIS

This thesis is comprised of eight chapters. The first chapter presents the background to the research. It offers a brief account of the context of the study, Saudi Arabia. The first chapter also offers a definition of e-learning and outlines its brief history. It also discusses its dimensions and potential. Moreover, the chapter delineates

the research problem and outlines its aim, questions and objectives. It concludes with an outline of the thesis structure. The second chapter describes the theoretical framework. It provides an extensive discussion of the theories adopted to build the research model. The third chapter is devoted to the research conceptual model. It provides a review of the literature on the adoption and acceptance of e-learning. It also defines the constructs that form the research model and reviews the relevant literature on each construct. The fourth chapter describes the methodology adopted to carry out this research. It discusses the rationale behind the chosen methodological approach. This chapter also illustrates the research sample, the techniques to collect data and ethical issues addressed in this study. The fifth chapter is devoted to the development and validation of the research instrument. It portrays the steps taken to construct and evaluate the questionnaire and describes in detail the pilot studies conducted to refine the instrument. The sixth chapter presents the results of the data analysis on the generated data. It answers the research questions and hypotheses. The seventh chapter provides a discussion of the research findings. The eighth chapter presents a summary of the research and concludes with the implications of the findings to theory and practice.

1.7 SUMMARY

This chapter has set the scene for the current research. The first part shed light on the Saudi context. The second part defined e-learning and outlined its dimensions and emergence. It then discussed the potential of e-learning for education. Subsequently, the chapter discussed the rationale for undertaking this research. It outlined the research aim, questions and objectives. The second chapter will expound the theoretical framework of this research.

2 CHAPTER TWO

THEORETICAL FRAMEWORK

2.1 INTRODUCTION

The topic of users' adoption of ICT has been researched from multiple theoretical perspectives using a wide range of constructs (Sun & Zhang, 2006; Taylor & Todd, 1995a). One important stream of research has employed intention-based theories (Fishbein & Ajzen, 1975; Ajzen, 1985), which use behavioural intention to predict and explain behaviours such as ICT usage, acceptance and adoption. This line of research focuses on the identification of the determinants of intention such as attitudes, social influences and facilitating conditions (Davis, 1989; Mathieson, 1991; Taylor & Todd, 1995a). A second line of research has investigated the adoption and usage of ICT from a Diffusion of Innovations perspective (Rogers, 1962, 2003; Tornatzky & Klein, 1982). This line of research focuses on a different set of factors as the key determinants of ICT adoption and diffusion (e.g. information sources, communication channels and innovations characteristics) (Moore & Benbasat, 1991).

The current research extends and integrates the intentions and innovations literature to investigate the determinants of e-learning adoption. Specifically, the study proposes a model to explain university students' adoption of e-learning by drawing upon constructs of robust theories from Social Psychology and Information Systems Management (ISM), particularly the theory of Reasoned Action (TRA), the theory of Planned Behaviour (TPB), the Technology Acceptance Model (TAM) and the Diffusion of Innovations theory (DOI). The objective of this chapter is to discuss the theories that structure the theoretical framework of this study. The chapter elaborates on each theory and reviews the pertinent literature.

2.2 THE THEORY OF REASONED ACTION

Explaining human behaviour has been the major objective of psychological theories (Trafimow, 1998). The theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975) aims to explain why individuals decide to perform particular behaviours. It focuses on the conscious decision of individuals to undertake specific behaviours. This model is different from other Social Psychology theories that attempt to explain general behavioural patterns (e.g. the cognitive-affective system theory of Mischel & Shoda, 1995). In contrast, TRA is concerned with an individual's decision to engage in or not to engage in a particular behaviour, such as enrolling on an e-learning course. The theory provides a detailed framework to understand and predict human behaviours and has had compelling support from rich empirical research.

Introduced initially in 1967 by Fishbein, TRA evolved basically as a result of dissatisfaction with traditional attitude-behaviour research that was characterised with weak correlations between attitude measures and volitional behaviours (Hale,

Householder, & Greene, 2002). The theory is an extension of Fishbein's Behavioural Intention Model (Fishbein, 1967), which is based on Dulany's (1961) theory of Propositional Control. Propositional Control theory states that a person's intention to perform (or his actual performance) is based on (a) his attitude toward performing the behaviour in a given situation, and (b) the norms governing that behaviour in that situation and his motivation to comply with those norms (Wilson, Mathews, & Harvey, 1975).

The ultimate goal of Fishbein and Ajzen's theory has been to predict and understand human behaviour. The new theory of Reasoned Action was proposed "to account for behaviour of various kinds by reference to a relatively small number of concepts embedded within a single theoretical framework" (Ajzen & Fishbein, 1980, p.4). The theory is based on the assumption that humans are usually quite rational and systematically exploit the information available to them. In other words, people consider the implications of their actions prior to making a decision to engage or not to engage in a particular behaviour (Ajzen & Fishbein, 1980).

In essence, the theory suggests that behaviours are not difficult to predict. TRA postulates that a person's Behavioural Intention (BI) to carry out (or not to carry out) behaviour is the immediate determinant of the behaviour (Ajzen & Fishbein, 1980). BI represents the individual's motivation in the sense of her or his conscious plan or decision to engage in the behaviour (Conner & Armitage, 1998). However, this, as Ajzen and Fishbein (1980) argue, does not mean that there will be at all times perfect connection between intention and behaviour. Excluding unexpected events, an individual "will usually act in accordance with his or her intention" (Ajzen & Fishbein, 1980, p. 5).

Intention is considered a necessary but not sufficient immediate determinant of behaviour (Ajzen, 1985). BI is held to be strongly correlated with behaviour under three conditions, which if met make it both a necessary and sufficient antecedent of behaviour (Liska, 1984). First, intention and behaviour should be measured at the same level of specificity in relation to the action, target, context and time frame (Fishbein & Ajzen, 1975). Second, the time interval should be short enough to ensure that intentions have not altered and hence maximises behaviour prediction from intention (Conner & Armitage, 1998). Third, the behaviour of interest should be under volitional control (Ajzen & Fishbein, 1980).

Fishbein and Ajzen (1975) were interested not only in predicting human behaviour, but also in understanding it. Thus, they attempted to identify the determinants of BI. According to their theory, a person's intention is a function of two basic factors, one personal in nature and the other signalling social influence. The personal determinant or attitude toward the behaviour (AT) is defined as "the individual's positive or negative evaluation of performing the behaviour" (Ajzen & Fishbein, 1980, p. 6). In other words, attitude refers to the individual's judgment that carrying out the behaviour is good or bad, i.e. he or she is in favour of or against executing the behaviour. For instance, the students may differ in their evaluations of

adopting e-learning. Some may have a favourable attitude and others an unfavourable attitude. The second determinant of intention is termed Subjective Norm (SN) and is defined as “the person’s perception of the social pressures put on him to perform or not perform the behaviour in question” (Ajzen & Fishbein, 1980, p. 6). Students may believe, for example, that most people who are important to them such as their tutors or peers think they should adopt e-learning or that they should not do so. Therefore, SN may exert pressure to perform or not to perform a particular behaviour, independent of the individual’s own attitude toward that behaviour (Ajzen & Fishbein, 1980). Overall, the theory posits that individuals intend to perform a particular behaviour when they evaluate it positively and when they believe that important others think they should perform it. Figure 2-1 summarises TRA.

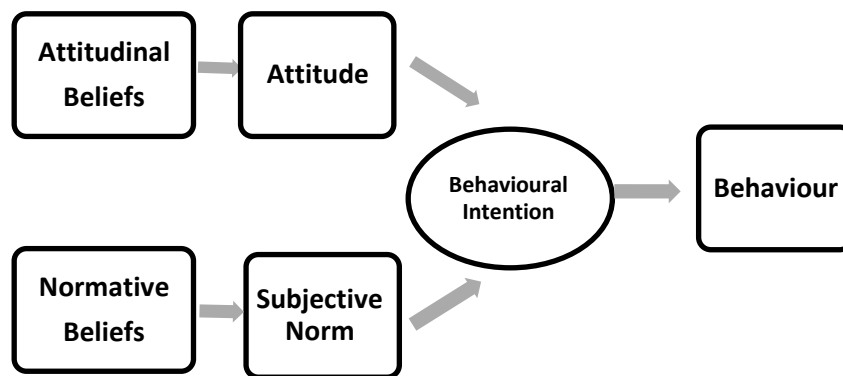


Figure 2-1: The Theory of Reasoned Action

TRA assumes that the relative importance of these determinants hinges partly on the intention of interest and may vary from one person to another. For some intentions, attitudinal considerations may outweigh the normative considerations, whilst for other intentions; normative considerations may be more important (Ajzen & Fishbein, 1980).

TRA provides also an explanation of why certain people hold certain attitudes and subjective norms. According to the theory, attitudes toward a particular behaviour are a function of salient beliefs about that behaviour. A belief is the information an individual has about a specific object. In particular, the belief connects an object with some attributes (Fishbein & Ajzen, 1975). According to TRA, each salient belief relates the behaviour with some valued outcomes (Ajzen, 1985). Attitude toward the behaviour is thus determined by the individual’s evaluation of the outcomes related to the behaviour and by the strength of these relationships.

The beliefs underlying a person’s attitude toward behaviour are termed behavioural or attitudinal beliefs (Taylor & Todd, 1995a). In general, an individual who believes that performing a particular behaviour will lead to favourable outcomes will hold a positive attitude toward performing the behaviour. On the other hand, a person who believes that carrying out the behaviour will result in negative consequences will hold an unfavourable attitude (Ajzen & Fishbein, 1980). For example, the student who believes that using e-learning (behaviour) would make her pursue her degree while working full-time or nurturing children at the house (outcomes), is likely to positively

evaluate the act of adopting e-learning, i.e. she will have a favourable attitude toward adopting e-learning. Conversely, a student is likely to hold a negative attitude toward adopting e-learning, if she believes that such behaviour would lead to lack of interaction with instructors and peers or would increase financial obligations (outcomes).

The theory also posits that SN is also a function of normative beliefs, i.e. individuals' beliefs about the extent to which other people who are important to them think they should or should not perform particular behaviours. As Ajzen (1988) explains, "people who believe that most referents with whom they are motivated to comply think, they should perform the behaviour will perceive social pressure to do so" (p.121).

TRA has been used in many studies with a wide variety of behaviours in diverse disciplines. Behaviours that have been studied applying TRA include, strategy choices in Prisoner's Dilemma games (Ajzen, 1971); blood donating (Pomazal & Jaccard, 1976); voting (Ajzen & Fishbein, 1980); family planning (Crawford & Boyer, 1985) and reporting alien abductions (Patry & Pelletier, 2001). In addition, TRA was the first theoretical perspective to gain widespread application in understanding the factors that influence individuals' use of ICT (Compeau & Higgins, 1995b). For example, Hansena, Jensenb, and Solgaard (2004) tested the ability of the theory to predict consumers' online grocery purchases intention. They concluded that TRA is capable of explaining a high proportion (63.7% and 55.3%) of the variation in future online grocery buying.

In addition, several meta-analyses have been conducted to validate the theory. For example, Sheppard, Hartwick, and Warshaw (1988) conducted two meta-analyses to investigate the effectiveness of the theory. Based on 87 separate studies with a total sample of 11,566 respondents, they reported a frequency-weighted average correlation between intention and behaviour of 0.53 that is significant at the 0.01 level. Moreover, their analysis revealed that the determinants of the theory, namely attitude toward the behaviour and SN, appeared to predict and explain intention quite well. A frequency-weighted average correlation for the relationship between attitude and SN with intention was 0.66, and was significant at the 0.001 level. Thus, their results provided strong support for the overall predictive utility of the theory.

Van den Putte (1991) conducted a more extensive meta-analysis using 113 studies. He reported a mean multiple correlation of 0.68 for predicting BI from its two constructs and a mean correlation of 0.62 for the intention-behaviour relationship. Van den Putte also found that the relation between intention and attitude is stronger than the relation between intention and SN (cited in Eagley & Chaiken, 1993, p. 176). Similarly, Albarracín, Johnson, Fishbein and Muellerleile (2001) meta-analysed 96 studies (N=22,594) to examine how well TRA predicted condom use. They found that intention was related to behaviour with a weighted mean correlation of 0.45. Further, the theory accounted for 0.70 of the variance in intention to use condom. Both attitude and SN were related to intention with correlation of $r=0.54$ and 0.39 respectively. The meta-analysis also gave support to the relationship between attitude and behavioural beliefs ($r=0.56$) and SN and normative beliefs ($r=0.46$).

The theory has been also applied in the educational domain to explain and predict various behaviours. For example, Ajzen and Madden (1986) conducted two experiments to test the theory of Reasoned Action to explain students' class attendance. The theory explained 0.55 of students' class attendance intentions and 0.36 of actual attendance. Similarly, Davis, Bagozzi and Warshaw (1989) examined TRA in a longitudinal study of 107 full-time MBA students. They investigated the students' usage of a word-processing programme. Attitude, SN, and intentions were measured following the introduction of the software as well as fourteen weeks later. In addition, usage was also measured. At both times, multiple correlations of 0.32 and 0.26 were found when attitude and SN were used to predict user intentions at times 1 and 2 respectively. Users' intentions were also found to predict actual use. Intentions at time 1 correlated 0.35 with behaviour measured 14 weeks later. At time 2, when intentions and behaviour were measured with a shorter time interval, a correlation of 0.63 was found.

Within online educational contexts, Chen and Chen (2006) adopted TRA to explain faculty participants' beliefs and attitude (N=116) towards participation in the teaching of online courses and to predict their BI. Attitude was found to correlate significantly with intentions ($r=0.70$) and with behavioural belief ($r=0.46$). Additionally, SN was significantly correlated with intentions ($r=0.32$) and with normative belief ($r=0.52$). Moreover, the researchers concluded that the determinants of the theory predicted very accurately faculty participatory intention (no R^2 was reported). In a study to examine students' adoption of high-tech innovations, Kulviwat, Bruner and Al-Shuridah (2009) applied TRA and found that both SN and attitude to have positive effects on students' intention to adopt an innovation. A recent study on the adoption of smart phones in Taiwan has also confirmed the robustness of the relationships proposed in TRA (Yang, 2009).

2.2.1 LIMITATIONS OF TRA

TRA provides a parsimonious account of the determinants of behaviour (Conner & Armitage, 1998). The work of Ajzen and Fishbein has not only provided a theoretical contribution to the understanding of behaviour, it has also offered an excellent set of instructions for implementing their theory. Their 1980 book explained the theory in detail, illustrated it with summaries of research and included a sample questionnaire that gives the exact wording they recommend for items measuring its constructs. However, the theory has received criticism. Generally, the theory has been criticised regarding three issues: the relationship between the concepts of attitude and SN; the sufficiency of TRA's predictors of intention and behaviours; and the limited scope of the behaviours explained by the theory (Hale et al., 2002).

Firstly, in Fishbein and Ajzen's TRA, attitude and SN are theorised to have two distinct impacts on BI. However, there is some evidence that these two constructs are overlapping rather than independent dimensions of intention (Warshaw, 1980; Miniard & Cohen, 1981; Trafimow, 1998). SN has shown inconsistent results and often weak relationships with intentions and strong correlation with attitude (Lutz, 1976). This state

of confusion, as Forward (2009) argues, is due to two factors: the conceptualisation of SN and the way the construct has been measured. Some researchers contend that SN as proposed by Fishbein does not really tap the essential conceptual content of social pressure (Lutz, 1976). Ahtola (1976) argues that the concept of SN can include 'several others' such as one's parents, spouse, friends, etc, whose views may conflict. In this case, Ahtola questions how the individual cognitively combines these opinions into a generalised opinion (Ahtola, 1976). He argues that people do not make such global attributions. Similarly, the way SN is measured as suggested by Fishbein and Ajzen (1975) can be misleading as Warshaw (1980) points out:

If opinion conflict is severe and polar (as frequently is true of parents' versus friends' opinions, especially among student subjects), do these opposite views cancel out? If so, the subject might mark the neutral midpoint on an SN scale, which would be a misleading response (i.e., it ascribes neutrality to "most others"). Alternatively, vacillating responses could emerge, generating inconsistency over time. (p.158)

However, Fishbein, Ajzen and their colleagues have continued treating attitude and SN as separate constructs. They argue that the each component is more strongly related to intentions than to each other (Bowman & Fishbein, 1978). Moreover, the two constructs were found to correlate in different ways with intentions as shown in some studies (Hale et al., 2002; Taylor & Todd, 1995a).

Secondly, TRA proposes that attitude and SN are the only meaningful determinants of intentions. Variables such as personality traits (e.g. authoritarianism, introversion-extraversion), demographic variables (e.g. sex and race) and intelligence are considered external. However, critics of TRA have contended that attitude and SN are not sufficient determinants of intentions with the presence of supporting evidence for some other key determinants such as moral norms (Prestholt, Lane, & Mathews, 1987), self-identity (Charng, Pavilian, & Callero, 1988; Conner & Armitage, 1998; Armitage, Conner, & Norman, 1999), affective beliefs (Conner & Armitage, 1998; Armitage et al., 1999) and past behaviour (Conner & Armitage, 1998). Nonetheless, Ajzen (1985) argues, "variables of this kind will be related to behaviour if, and only if, they influence the beliefs that underlie the behaviour's attitudinal or normative determinants" (p. 14). Ajzen and Fishbein (1980) further assert, "One of the major disadvantages of relying on external variables to explain behaviour is that different kinds of external variables have to be invoked for different behavioural domains" (Ajzen & Fishbein, 1980, p. 9). As such, this state of affairs has led to a large number of theories relating external variables to behaviours, which, according to Ajzen and Fishbein's (1980) point of view, "impedes scientific progress" (p.9). TRA with its small set of variables can account for the links (or lack of links) between any external variable and any kind of behaviour.

Finally, in proposing that behaviour is determined by intention, TRA has been criticised for restricting its scope to volitional behaviours (Hale et al., 2002). Behaviours requiring skills, resources, opportunities and cooperation of others in order to be

accomplished are excluded from the domain of TRA, or are poorly predicted by TRA (Liska, 1984; Hale et al., 2002). Similarly, behaviours that are categorised as spontaneous, impulsive, habitual, the results of craving or simply mindless are also excluded because their performance may not be voluntary or involve a conscious decision (Bentler & Speckart, 1979).

In an effort to expand the range of behaviours explained by TRA, Ajzen (1985) proposed a modified version of the theory, that is the theory of Planned Behaviour (TPB) that will be the topic of the next section.

2.3 THE THEORY OF PLANNED BEHAVIOUR

TRA applies to behaviours that are under volitional control. However, its predictive accuracy “diminishes when the behaviour is influenced by factors over which at least some individuals have only limited control” (Ajzen, 1985, p. 36). Ajzen (1985) proposed the theory of Planned Behaviour (TPB) to expand TRA and permit it to predict and explain behaviours that are not completely under volitional control. Similar to TRA, TPB is also based on the assumption that human beings usually behave in a sensible way; they take account of available information and consider the implications of their behaviours (Ajzen, 2005).

The theory hypothesises that an individual’s intention to perform a particular behaviour is the most important immediate determinant of that behaviour. In addition, the theory postulates that intention is a function of three basic determinants, one personal in nature, one reflecting social impact and the third related to issues of control (Ajzen, 2005).

The first determinant of intention is attitude or the person’s positive or negative evaluation of performing a given behaviour. The second determinant is SN or the individual’s perception of social pressure to perform or not to perform the particular behaviour of interest. Finally, TPB adds the construct of Perceived Behavioural Control (PBC) or “the sense of self-efficacy or ability to perform the behaviour of interest” (Ajzen, 2005, p. 118). The concept of PBC is similar to Bandura’s (1977, 1997) concept of self-efficacy, which will be discussed in detail in the following chapter. Therefore, “intentions would be expected to influence performance to the extent that the person has behavioural control, and performance should increase with behavioural control to the extent that the person is motivated to try” (Ajzen, 1991, p. 183).

In essence, TPB is an extension of TRA with the addition of PBC. According to TPB, people generally intend to perform behaviour when they judge it positively; when they feel social pressure to perform it; and when they perceive that they have the means and resources to do so (Ajzen, 2005).

Like TRA, TPB also assumes that the relative importance of the three determinants depends partly on the intention of interest and that they vary across people. In other words, one determinant may explain the intention in some behaviours,

whereas in others, two or the three determinants are equally needed. Figure 2-2 represents a graphical summary of the theory of Planned Behaviour.

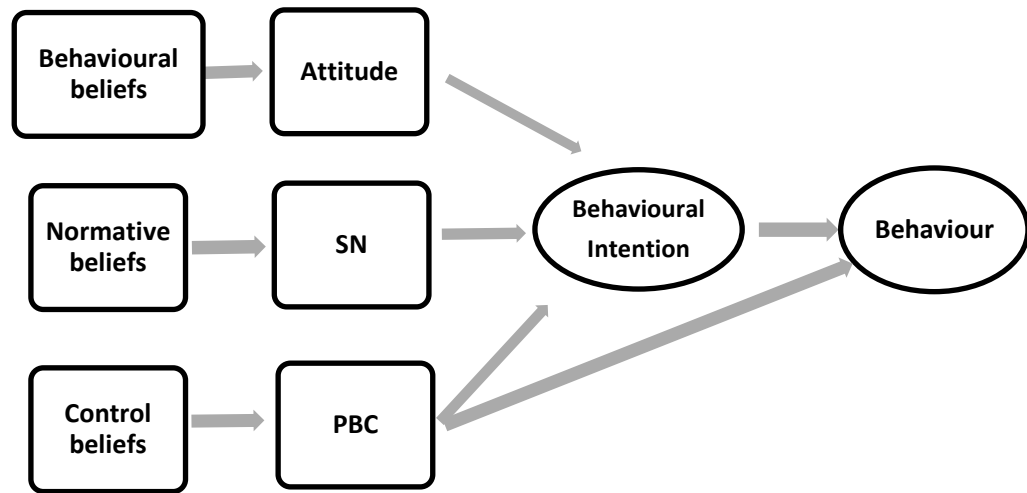


Figure 2-2: The Theory of Planned Behaviour

Many factors whether personal or external can obstruct the performance of any behaviour. As such, BI can best be interpreted as an intention to try performing a particular behaviour. Successful performance of the intended behaviour is dependent on the individual's control over the different factors that may impede it. TPB takes this view and proposes that intentions can only be expected to predict an individual's attempt to perform behaviour, not necessarily its actual performance (Ajzen, 1985).

Furthermore, the theory does not address the actual control the individual may have in a particular instance; instead, the theory deals with the possible effects of PBC on achievement of a behavioural goal. PBC, hence, accounts for some of the realistic constraints that may exist and offers useful information in addition to intention, which only reflects a person's willingness to perform a given behaviour (Ajzen, 2005).

The theory has two important aspects. Firstly, TPB hypothesises that PBC has a direct link with intentions. Giving an example from the research context illustrates this. A student who believes that she has neither the means nor the chance to use e-learning is unlikely to have strong intentions to adopt it, even though she has positive attitude towards adopting e-learning and believes that important referents (e.g. peers and instructors) would approve of her using e-learning. As figure 2-2 shows, the direct arrow from PBC to intention illustrates this relationship. Secondly, TPB proposes a direct association between PBC and behaviour. Ajzen (2005) contends,

In many instances, performance of behaviour depends not only on motivation to do so but also on adequate control over the behaviour in question. It follows that PBC can help predict goal attainment independent of BI to the extent that it reflects actual control with some degree of accuracy (p. 119).

PBC can influence behaviour indirectly through intentions as well as directly as it works as a proxy for a measure of actual control (Ajzen, 2005).

A substantial amount of research has applied, tested and extended TPB. For example, Ajzen (1991) meta-analysed 16 studies which used the theory. These studies sought to explain and predict a variety of behaviours such as playing video games, losing weight, cheating, shoplifting and lying. The meta-analysis revealed that intentions and PBC correlated quite well with behavioural performance. The two antecedent variables made a significant contribution to the prediction of behaviour. In most of the reviewed studies, intention was found to be the more important of the two predictors. Nevertheless, in the studies on weight loss (Schifter & Ajzen, 1985; Netemeyer, Burton, & Johnston, 1991), PBC surpassed the contribution of intention. The studies also revealed that the three predictors in TPB could account for a substantial amount of variance in BI. The multiple correlations ranged from 0.43 to 0.94, with an average correlation of 0.71. Moreover, the addition of PBC to the theory made a considerable improvement in the prediction of intentions; the beta coefficients of PBC were significant in all studies. The meta-analysis also uncovered that, with only one exception, attitude toward the different behaviours made significant contributions to the prediction of intentions, while SN showed mixed results. An explanation of this finding is that, for some behaviour, personal considerations are likely to surpass the impact of perceived social pressure.

In a similar study, Armitage and Conner (2001) conducted a meta-analysis using 185 studies that applied TPB to explain also various behaviours. The findings of this meta-analysis are robust as the researcher ensured the reliability of the data included in their study. The study showed that across all behaviours, BI and PBC accounted for 27% of the variance in behaviour. However, the analysis revealed that PBC added an average of 2% to prediction of behaviour, besides intention. Ajzen (1991) explicates that for behaviours where there are no problems of volitional control; PBC will add nothing to the prediction of behaviour. Overall, the analysis revealed that the average multiple correlation of attitude, SN and PBC with BI was 0.63, accounting for 39% of the variance in BI. Specifically, PBC was significantly correlated with intention ($r=.43$), and independently accounted for 6% of the variance in intention, whilst controlling for attitude and SN. The meta-analysis revealed that the SN–intention correlation was significantly weaker than the other relationships. This may be because there was little external pressure to perform the behaviours under study. Indeed, other studies (Moore & Benbasat, 1991) have found SN to be an important determinant of intention and behaviour especially when people have limited knowledge from which to develop attitude (Taylor & Todd, 1995a). The researchers pointed out that SN and the methods of measuring it still require more investigation. Furthermore, Armitage and Conner's (2001) review provided further support for the hypothesised relationships between belief-based and direct measures of attitude, SN and PBC, ($r_s=0.50, 0.50, 0.52$ respectively). The study also found that when behaviour measures were self-reports, TPB accounted for 11% more of the variance in behaviour than when behaviour measures were objective or observed ($R^2s = .31$ and $.21$, respectively).

In a review of the theory in health related behaviours, Albarracín et al. (2001) conducted a meta-analysis of 96 datasets from 42 reports that applied TPB. Their review indicated that the theory is highly successful in predicting and explaining behaviour. They also reported that PBC was correlated moderately with behaviour (the weighted mean correlation, $r=0.24$). Contrary to the previously mentioned studies, the impact of this construct on behaviour was found very small ($\beta=.05$). Nevertheless, the study reported that this relationship between behaviour and PBC became greater when behaviour was measured retrospectively and PBC was measured concurrently ($r=0.34$). That is, the more one has performed the behaviour in the past, the more likely it is that one will perceive control over the behaviour.

Likewise, Godin and Kok (1996) investigated the application of TBP in predicting health-related behaviours. The authors reviewed 56 studies. They reported that attitude, SN, and PBC accounted for an average of 41% of the variance in BI. On average, the PBC construct provided an additional 13% to the explained variance in BI. Godin and Kok (1996) concluded that PBC is an important construct for explaining and predicting intentions to carry out health-related behaviours. Moreover, they argue that SN was less important in the prediction of intentions in this domain.

Moreover, TPB was applied to explain behaviours related to ICT. For example, Carswell and Venkatesh (2002) adopted the theory to investigate students' acceptance and intentions to use a technology-mediated, asynchronous distance environment. The researchers found that the factors in TPB accounted for 65% of the variance in intention to continue using the web-based environment. The correlations between BI and the three determinants were statistically significant with strong effect size (0.80 for BI-attitude, 0.50 for BI-SN and 0.42 for BI-PBC at the .01% significance level). However, on examining the contribution of each determinant, only attitude contributed significantly ($\beta=.750$) in explaining intentions, while SN ($\beta=.053$) and PBC ($\beta=.044$) had non-significant and small magnitude effects.

Liaw (2004) applied TPB to understand students' intentions to use search engines as a learning tool (N=161). The study operationalised attitude to include perceived satisfaction of search engines; SN to include sharing search experience and information and PBC to include search engines as an information retrieval tool. The study findings revealed that the three factors of the theory accounted for 33% of the variance in BI. Attitude was the best predictor of BI as it accounted for 21% of its variance.

Ndubisi (2006) has investigated online learning acceptance among Malaysian students (N=300). His study revealed that the dimensions of TPB predicted 24% of the variations in online learning adoption BI. Attitude ($\beta=.45$) and PBC ($\beta=.16$) contributed significantly in explaining adoption BI, while SN ($\beta=.07$) had a non-significant impact on intentions.

Similarly, Shih (2008) applied the theory to assess learners' intentions to adopt web-based learning (N=319). Yet, in his investigation, Shih did not include SN. The findings confirmed that attitude and PBC had significant correlations with BI ($r=0.24$

and $r = 0.39$ respectively and both were significant at the 0.001 level). In addition, attitude explained 25% of the variance in intentions whereas PBC accounted for 38%.

Abdel-Wahab (2008) examined factors that predict students' BI to adopt e-learning at an Egyptian University (N=258). Among the variables he investigated in this study were constructs of TPB. The results showed that within the domain of educational technology adoption, attitude, resources availability and pressure to use had significantly correlated with adoption BI ($rs=0.45, 0.30, 0.35$ respectively). Lee (2009a) conducted a study to explain customers' intention to use online banking applying TPB. His study found that attitude, SN and PBC to be significant determinants of a consumer's BI to adopt online banking.

In summary, TPB has proved a useful model in predicting and explaining BI from attitude, SN and PBC constructs across a range of behaviours. The addition of the PBC construct has significantly increased the amount of the explained variance in intention.

2.3.1 LIMITATIONS OF TPB

TPB has been criticised on some grounds, particularly on similar issues to those concerning TRA. The PBC component of the theory has attracted criticism for its ambiguity (Armitage & Conner, 1999) and narrow conceptualisation (Terry, 1993). Moreover, the PBC construct was criticised in relation to how it is measured (Armitage & Conner, 1999). Although Ajzen (1991) contends that PBC is similar to the concept of self-efficacy, several studies have suggested PBC as to include various constructs (Armitage & Conner, 1999).

Another criticism revolves around the way the indirect belief-based constructs of the model are measured. Taylor and Todd (1995a) argued that the belief structures are combined into uni-dimensional constructs (e.g. $A = \sum biei$). These belief products may not be consistently correlated with attitude, SN or PBC. In addition, the belief products, particularly those pertinent to attitude, are idiosyncratic to the empirical context which causes difficulty in operationalising the TPB constructs (Taylor & Todd, 1995a). Ajzen (1991) acknowledges that the association between the beliefs components and the three determinants of intention (A, SN and PBC) are not well understood.

2.4 THE TECHNOLOGY ACCEPTANCE MODEL

TRA and TPB are general theories that have been proposed to explain and predict "virtually any human behaviour" (Ajzen & Fishbein, 1980, p. 4). The Technology Acceptance Model (TAM) is another theory that deals with human behaviour, yet it was specifically tailored to predict and explain technology-related behaviour. Davis (1989) proposed TAM to "provide an explanation of the determinants of computer acceptance that is general, capable of explaining user behaviour across a broad range of end-user computing technologies and user populations, while at the same time being both parsimonious and theoretically justified" (Davis et al., 1989, p. 985). A key objective of

TAM is to offer a basis for tracing the influence of external factors on internal beliefs, attitude and intentions, so that researchers and practitioners “can identify why a particular system may be unacceptable, and pursue appropriate corrective steps” (Davis et al., 1989, p.985).

Davis (1989) adopted TRA as a theoretical framework and identified two fundamental constructs suggested by previous research dealing with the cognitive and affective determinants of computer acceptance: Perceived Usefulness (PU) and Perceived Ease of Use (PEOU). TAM hypothesises that the two specific beliefs, PU and PEOU, are of prime importance for computer acceptance behaviours. PU is defined as “the degree to which a person believes that using a particular system would enhance his or her job performance” (Davis, 1989, p. 320). PEOU is defined as “the degree to which a person believes that using a particular system would be free from effort” (Davis, 1989, p. 320). Like TRA, TAM proposes that computer usage is determined by intention. However, TAM differs from TRA in that intention is only determined by attitude toward using the system and PU as shown in figure 2-3.

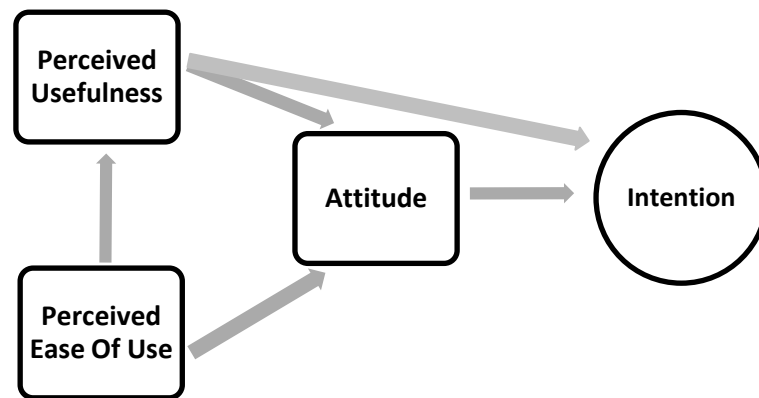


Figure 2-3: The Technology Acceptance Model

The other determinant of intention in TRA, SN was not incorporated into TAM due to its theoretically and psychometrically uncertain status (Davis et al., 1989). However, Venkatesh and Davis (2000) have subsequently added this construct in another version of TAM termed TAM2.

The relationship between attitude and intention drawn from TRA suggests that individuals form intentions to carry out behaviours toward which they hold positive attitude. The second relationship between PU and intention implies that an individual forms intentions to perform behaviour he or she believes will increase job performance, beyond any favourable or unfavourable attitude he or she holds toward the behaviour (Davis, 1989). The PU-BI relationship is based on Vroom’s (1964) argument that improved performance is instrumental to obtaining rewards such as promotions and pay increases. The PU-BI link implies that intention is formed from cognitive decisions to enhance performance without the need to activate the positive affect related to performance (Davis et al., 1989). In other words, a person forms intentions to use a system based on a cognitive evaluation of how the system will improve his or her performance. Still, as affect is not always evoked when deciding to use a system,

attitude is not expected to fully capture the influence of performance on intention (Davis et al., 1989).

The model also proposes that attitude is determined jointly by PU and PEOU. This relationship is based on the proposition of TRA that attitude is formed by relevant salient beliefs, in this model: beliefs of usefulness and ease of use. However, in TRA, salient beliefs are elicited for every new setting. Thus, they are idiosyncratic to the specific context, whereas in TAM, the two beliefs of usefulness and ease of use are proposed *a priori* as general antecedents of acceptance (Mathieson, 1991).

PU influences attitude directly. That is, perceptions of rewards due to performance outcomes might increase one's affect toward achieving those outcomes (Davis et al., 1989). Further, PEOU influences attitude. TAM distinguishes two processes by which PEOU affects attitude: self-efficacy and instrumentality (Davis et al., 1989). Self-efficacy implies a person's beliefs about his or her performance ability (Bandura, 1997). The easier a system is to interact with, the greater should be the users' sense of efficacy regarding their ability to carry out the sequences of behaviour needed to operate the system (Bandura, 1986). Moreover, improvements in perceptions of ease of use are said to be instrumental, i.e. it contributes to increased performance (Davis et al., 1989). This relationship is encapsulated in the direct link from PEOU to PU as illustrated in figure 2-3 above.

Finally, according to TAM, all other variables not overtly included in the model are expected to influence BI and usage through PEOU and PU (Davis et al., 1989). Legris, Ingham and Collette (2003) confirmed this proposition in their meta-analysis of TAM. These external factors may include system characteristics (Moore & Benbasat, 1991); self-efficacy (Taylor & Todd, 1995a); training, support and user's characteristics (Davis et al., 1989; Ndubisi, 2006).

TAM has been extensively applied to understand and explain users' intention to accept and use a wide range of technological innovations across different users groups in various contexts. For example, word processors (Davis et al., 1989); spreadsheet applications (Mathieson, 1991; Al-Gahtani & King, 1999); e-mail (Szajna, 1996); web browsers (Morris & Dillon, 1997); telemedicine (Hu, Chau, Sheng & Tam, 1999); internet-based courses, (Arbaugh, 2000a, b); websites, World Wide Web (Moon & Kim, 2001; Koufaris, 2002); on-line shopping (Vijayarathy, 2004); the internet (Shih, 2004); Blackboard (Ndubisi, 2004); educational hypermedia (Gao, 2005); 3G mobile internet (Phuangthong & Malisawan, 2005); weblogs (Theng & Wan, 2007); WebCT (Ngai, Poon & Chan, 2007); multimedia messaging services (Wang, Lo, & Fang, 2008). The popularity of TAM is also evident in the sheer volume of articles citing the introductory papers of TAM by Davis (1989) and Davis et al. (1989) (Venkatesh, Davis, & Morris, 2007). TAM continues to be the most broadly applied theoretical model in the Information Systems field (Lee, Kozar, & Larsen, 2003).

Davis et al. (1989) assessed TAM by studying 107 full-time MBA students' usage of a word-processing programme. They measured TAM variables immediately after introducing the programme as well as 14 weeks later with usage was measured at time 2

only. The results emerged from that study supported the mediating effect of intention on behaviour as none of the TAM variables had a significant effect on usage over and above intentions at both times. In addition, TAM explained a significant proportion of the variance in intention at time 1 (47%) and at time 2 (51%). Attitude had a small effect size on intention in time 1 ($\beta=.27$) but a non-significant effect in time 2 ($\beta=.16$). PU was found to have very strong effect on intention in both times ($\beta=.48$ and $.61$). PU was also a strong predictor of attitude in both times ($\beta=.61$ and $.50$). PEOU was found significant at time 2 only ($\beta=.24$). Overall, the study found TAM a model capable of explaining technology acceptance. However, based on the weak influence of attitude, the researchers suggested a more parsimonious model without the attitude construct.

Venkatesh and Davis (2000) proposed TAM2 with additional constructs including SN, image, job relevance, output quality, result demonstrability, experience and voluntariness. They tested TAM2 in a longitudinal study (three times: pre-implementation, one month post-implementation, and three months post-implementation) in voluntary and mandatory contexts on 156 employees at four organisations. The findings showed that the new constructs significantly influenced user acceptance and the new model accounted for 40% - 60% of the variance in usefulness perceptions and 34% - 52% of the variance in usage intentions. However, the samples of this study were particularly small (less than 50 participants in each group) which might affect its results.

Some studies in the literature compared TAM to other models. For example, Mathieson (1991) comparing TAM and TPB for predicting students' intention ($N=262$) to use spreadsheets and calculators, found that TAM explained slightly more variance (69%) in intention than TPB did (62%). In addition, TAM explained students' attitude better (73% vs. 41%). He concluded that decomposing the attitudinal beliefs into the two constructs, PU and PEOU gave TAM a more explanatory power than TPB. In addition, TAM provides a fast and economical way to collect broad information regarding users' beliefs of a system. It can be used to measure general levels of satisfaction across a range of users with diverse interests. However, TPB delivers information that is more specific and gives more insight into why an individual or group might be dissatisfied. Yet, it is more costly to apply.

Similarly, Taylor and Todd (1995a) compared TAM to TPB and a decomposed version of TPB in a longitudinal study of 786 students who used a computer information resource service. The researchers found that in all three models, intention was the primary direct determinant of behaviour. The correlation between intention and behaviour in TAM was 0.53, which is stronger than what Davis et al. (1989) reported in their study but identical to what Sheppard et al. (1988) found. This correlation implies that intention alone accounts for almost 30% of the variance in behaviour, thus giving support to the intention-behaviour relationship proposed in TAM, TRA and TPB. Regarding intention, TAM explained less variance in intention than TPB and its decomposed version ($R^2=.52$, $.57$, $.60$ respectively). This is possibly due to the presence of more variables in TPB and its extended version. This, nonetheless, implies that TAM,

employing only two variables, PU and PEOU, can explain over 50% of the variance in intention, while the decomposed TPB increased the explained variance up to only 2% of use, and to 8% of intention, paying a high price by adding seven more variables. TAM is thus a parsimonious model. The researchers concluded that TAM is a useful tool if the central goal is to predict IT usage, whereas the decomposed TPB provides a more complete understanding of the determinants of intention.

In the same way, Chau and Hu (2001) compared TAM, TPB and the decomposed TPB models (Taylor & Todd, 1995a). The results were also in line with that of Mathieson (1991). In their comparison, they concluded that TAM was superior to TPB in explaining doctors' intention to use telemedicine technology. The findings also revealed that PU was the most significant factor in explaining doctors' acceptance of technology while PEOU was not a significant factor.

In a replication study to mainly evaluate the psychometric properties of Davis' PU and PEOU scales, Adams, Nelson and Todd (1992) examined the relationship between PU, PEOU, and system usage of five different computer and internet-related applications: e-mail, voice-mail and three pieces of software. They found that, in general, TAM sustained its robust reliability and validity in explaining users' acceptance of innovative technologies.

Premkumar and Bhattacharjee (2008) tested TAM and compared it to the Expectation Disconfirmation Model (EDT) (Oliver, 1980). EDT was proposed in the marketing literature to explain the determinants of consumer satisfaction/dissatisfaction and consequent retention of products and services. The research was a longitudinal study of computer-based tutorial (CBT) usage by 175 junior and senior level undergraduate students. The findings demonstrated that TAM explained 69% of the variance in intention to continue using CBT. This explanation was mainly from PU, ($\beta=.82$). However, PEOU did not significantly influence either PU or BI, consistent with some previous TAM research (Venkatesh & Davis, 2000).

TAM has also been the subject of several meta-analyses. For example, Legris et al. (2003) analysed 22 articles that applied TAM and concluded that the relationship between TAM's constructs are positive and strong. However, the authors argued that such strong links do not mean that these variables are sufficient to predict ICT adoption. Thus, Legris et al. (2003) called for incorporating other variables related to both human and social change processes and to the adoption of the innovation model. Lee et al. (2003) also conducted a meta-analysis of 101 TAM articles covering the period from 1986 to 2003. They found that PU is the strongest determinant of intention and behaviour. In addition, PEOU was found as an unstable measure in predicting intention or behaviour. However, PEOU was found as a significant determinant of PU, rather than an analogous, direct antecedent of acceptance, and thus it can affect indirectly the acceptance through PU. The results of this study also supported the strength of TAM's constructs and relationships.

Ma and Liu (2004) have also synthesised and analysed existing empirical findings on TAM. Their meta-analysis is characterised by the inclusion of unpublished research

(e.g., dissertations) to avoid inflating the effect sizes of the links between the constructs of TAM. They studied particularly three relationships in TAM, the link between PU and behaviour, the link between PEOU and behaviour and the link between PU and PEOU. Their review found an almost identical large effect size for the relationships between PU and behaviour as well as for the relationship between PU and PEOU, a conclusion that is different from the general perception that the link between PU-B is stronger than PU-PEOU. The study also reported that the relationship between PEOU and behaviour had a medium effect size. This, again, implies the uncertain status of PEOU influence on behaviour. In addition, the researchers calculated 99% confidence intervals to assess the significance of the results and reported that all three relationships were positively significant at the 0.01% level. The results of this meta-analysis thus, confirmed Davis' (1989) original findings.

Similarly, King and He (2006) analysed 88 TAM studies. Their meta-analysis found that TAM measures are highly reliable and may be used in a variety of contexts. Moreover, the study also uncovered that TAM correlations, while robust, have substantial variability, suggesting that other moderator variables may help explain the effects. The influence of PU on BI was the strongest, capturing much of the impact of PEOU. Their study found that the only context in which the direct effect of PEOU on intention was very important was in internet applications.

Schepers and Wetzels (2007) conducted a meta-analysis of 63 TAM studies using the Structural Equation Modelling (SEM) method for their analysis. The relationships of TAM were confirmed. Both correlation analysis and SEM showed the significance of PU and PEOU towards attitude and BI. The analysis provided evidence for a stronger dependence of an individual on utility (PU) than on lower complexity (PEOU) when adopting new technologies. Both correlations and path coefficients were higher for relationships with PU than those with PEOU were.

Yousafzai, Foxall and Pallister (2007) conducted a meta-analytic study of TAM which covered 95 studies between 1989 and 2004. Their meta-analysis results were consistent with the relationships observed in Davis et al. (1989). The findings revealed that PU and PEU are linked with attitude, intentions and usage. Specifically, the weighted mean effect size for the relationship between intention-usage was 0.46, for the relationship between attitude and intention was 0.56, for the link between PU and intention was 0.55, for the link between PU and attitude was 0.53, for the link between PEOU and intention was 0.45 and finally between PEOU and PU was 0.44, all significant at the .05% level. An interesting finding emerged from that meta-analysis is that PEOU was found to be more important than PU in determining the attitude of students sample and in laboratory experiments.

Within the context of e-learning, Gao (2005) applied TAM in a study to predict students' acceptance of a hypermedia-based course companion website. His study found that PEOU accounted for 63% of the variance in PU. Both constructs explained also 62% of the variance in attitude, with PU as the strongest predictor while PEOU emerged as non-significant. The study also found attitude and PU to be important determinants of

intention to use with PU being significant at the .01 % level of significance and attitude toward use being significant at .05 % level of significance. In this study, TAM explained about 59% of variance in intention to use. The results of Gao's study revealed that all the relationships between the constructs of the model were found to be significant apart from the relationship between PEOU and attitude, which was not significant. However, a major limitation of the study was its small size sample (N=56) that casts doubts on its findings.

Huang et al. (2006) adopted TAM to investigate 322 individuals' acceptance of e-learning in public unemployment vocational training. The researchers used TAM's measurement scales. Their study found that TAM explained 33% of the variance in intention to accept e-learning. PU was the strongest predictor of intention ($\beta=.36$), whereas attitude showed a lesser but significant effect ($\beta=.26$). PU had also a strong significant effect on attitude ($\beta=.55$), while PEOU showed significant but lesser effect ($\beta=.24$). PEOU was found strong in influencing PU ($\beta=.46$).

Pituch and Lee (2006) applied TAM to study college students' intentions (N=259) to use an e-learning system. The two determinants of attitude in TAM, PU and PEOU were key antecedents of intention to use. Their study also extended TAM to include other constructs such as three different system characteristics (system functionality, interactivity and responsiveness) as well as some individual constructs (self-efficacy). The two beliefs in TAM were also found to partially mediate the relationships between the additional constructs and intentions to use e-learning.

Masrom (2007) applied TAM to study diploma students' (N=198) intentions to use e-learning for work-related tasks. Using a survey method, the study found that PU and PEOU were significant determinants of attitude towards using e-learning. PU was also significant in determining intentions to use e-learning, yet, attitude was not a significant antecedent of intention to use. The researcher argues that such an insignificant effect of attitude on intentions might reflect limitations of TAM's applicability with respect to technologies, user populations, or both.

In a TAM study that was conducted in a Middle Eastern country, Abdel-Wahab (2008) investigated students' acceptance of e-learning. His study reported similar findings to the above studies and concluded that the core relationships of the theory also hold in the Middle Eastern context. Park (2009) investigated Korean students' intention (N=628) to adopt e-learning applying TAM. The study confirmed TAM to be a useful theoretical model in helping to understand and explain BI to use e-learning.

2.4.1 LIMITATIONS OF TAM

During the past two decades, TAM has been considered a parsimonious and powerful theory (Venkatesh & Davis, 2000; Lee et al., 2003) to explain intention to accept different technologies (e.g. job-based, educational and health-related technologies and ICT Systems) under different situations (e.g., Lab experiments vs. Field study) within various cultures (e.g. USA, UK, China, the Netherlands, Saudi

Arabia) with different moderating factors (e.g., gender, age, etc.) and different subjects (e.g. students, knowledge workers, etc.). A powerful aspect of TAM is that it has a sound theoretical basis (Yousafzai et al., 2007). Davis (1989) adopted TRA as well as drew his key constructs from a diverse line of research including the self-efficacy theory (Bandura, 1986), expectancy theory (Vroom, 1964), Diffusion of Innovations (Rogers, 2003). By itself, TAM has also served as a theory base to study several problems in IS and other fields (Venkatesh et al., 2007).

Another appeal of this model is its parsimony. TAM proposes a small set of determinants that jointly explain usage. These determinants are “specific, easy to understand and can be manipulated through system design and implementation. In addition, they should also be generalisable across settings” (Taylor & Todd, 1995a, p. 148). Another advantage of this parsimonious beliefs-based model is that it gives useful diagnostic information. By representing the beliefs separately, the researchers can “better trace the influence of external variables, such as system features, user characteristics and the like, on ultimate behaviour” (Davis et al., 1989, p. 988).

In addition, TAM has psychometrically sound measurement scales (Yousafzai et al., 2007). Davis (1989) gave great attention in constructing a solid scale to measure PU and PEOU ($\alpha=0.98, 0.94$ respectively). TAM’s instrument has been repeatedly assessed by other researchers and showed robust validity and reliability (Adams et al., 1992). Numerous studies have reported that TAM’s scales are internally reliable (Davis et al., 1989; Mathieson, 1991; Adams et al., 1992). Similarly, Legris et al. (2003) and King and He (2006) in their meta-analyses of TAM, reported high internal reliability levels for almost all instruments (based on Davis’ original scales) measuring PU and PEOU in the studies examined. Davis (1989) and Adams et al., (1992) reported good convergent and discriminant properties of TAM’s instrument. Moreover, other researchers have evaluated the two-factor model of TAM measurement (Subramanian, 1994; Chin & Todd, 1995). Further, Szajna (1996) has demonstrated its predictive validity. The availability of a robust instrument makes straightforward the comparison of results across studies and helps cumulative theoretical development (Mathieson et al., 2001).

However, despite its great success, TAM also has limitations. As discussed previously, TAM has gained an eminent status not only in ISM but also in other fields such as educational technology and health-care research (Venkatesh et al., 2007). This popularity is mainly a result of its parsimony, yet capability to provide important diagnostic information (Davis et al., 1989). However, this parsimony and simplicity are also its major limitation (Venkatesh et al., 2007) and “an Achilles’ heel for TAM” (Bagozzi, 2007, p. 244). While TAM can offer valuable insights into user acceptance of technology, it only gives attention to two determinants of behaviour, PU and PEOU and does not provide how such beliefs are formed or how they can be controlled to boost users’ acceptance and usage (Mathieson, 1991; Venkatesh et al., 2007). In other words, the generality of TAM, which stems from its parsimony, may inform developers that a technology was not easy to use, yet, it will not identify other issues that might prevent acceptance and usage (Mathieson, 1991).

Nevertheless, some research has identified the antecedents of the key constructs of TAM, for example, the determinants of PU (Karahanna & Straub, 1999; Venkatesh & Davis, 2000) and the determinants of PEOU (Venkatesh, 2000). This line of research has helped deepen understanding of the cognitive underpinnings of the key predictors of technology adoption and use (Venkatesh et al., 2007).

Another attempt to overcome the parsimony limitation of TAM has been by extending the model to incorporate other key determinants of acceptance. For example, Venkatesh, Morris, Davis and Davis (2003) proposed an extended version of TAM termed the Unified Theory of Acceptance and Use of Technology (UTAUT). This model has four core determinants of intention and usage: performance expectancy, effort expectancy, social influence and facilitating conditions. UTAUT has also four moderators of its key relationships including experience, voluntariness, gender and age. The model was tested and found to outperform TAM with 70% of the variance in intention explained by using it (Venkatesh et al., 2003).

Moreover, a limitation of the research done on TAM is its noticeably narrow segment of samples. Cushman and Klecun (2006) noted that this research has “overwhelmingly concentrated on two groups, business professionals and university students, both groups with successful educational backgrounds and familiar with environments where ICTs are pervasive” (p. 3). Legris et al. (2003) in their meta-analysis observed applications of TAM solely on students’ samples. Lee et al. (2003) in their meta-analysis of 101 studies reported that 46 studies used student subjects while the remaining 60 used knowledge worker subjects. This skew in the samples in TAM studies is, as Cushman and Klecun (2006) noted, due to TAM’s origins in IS in business, as such, TAM “privileges the worldviews of the included and further marginalise[s] the already excluded” (p. 4). They highlight the importance of focusing on other sectors of the population.

Yousafzai et al. (2007) noted that a possible difficulty of applying TAM beyond the workplace is that the model’s fundamental constructs do not fully reflect the variety of tasks in other environments. Yet, some studies have successfully modified the wording of the constructs to reflect their unique contexts and re-established the validity and reliability of their instruments (e.g. Taylor & Todd, 1995a).

Another limitation of TAM (and the other theories adopted in intention research line) is the reliance on self-report measures as a source of usage instead of actual usage (Legris et al., 2003). Since the bulk of research on TAM (similarly on TRA and TPB) did not gauge actual usage, but instead the variance in self-reported use, such measure should be considered a proximate indicator of actual usage at best (Legris et al., 2003).

2.5 ROGERS’ DIFFUSION OF INNOVATION MODEL

Proposed by Rogers (1962), the Diffusion of Innovations theory (DOI) is a general model to describe how innovations spread through societies. Diffusion is “the process in which an innovation is communicated through certain channels over time

among the members of a social system” (Rogers, 2003, p. 5). Rogers (2003) sees diffusion as a type of social change that is a process by which alteration takes place in the structure and operation of a social system. Rogers (2003) further contends that “when new ideas are invented, diffused, and adopted or rejected, leading to certain consequences, social change occurs” (p. 6). Rogers identifies four important elements in his framework: an innovation, communication channels, time and a social system. The innovation is “an idea, practice, or object that is perceived as new by an individual or other unit of adoption” (Rogers, 2003, p. 12). Communication channels are “the means by which message get from one individual to another” (Rogers, 2003, p. 18). Examples of communication channels include mass media and interpersonal channels. Time is an important variable and its inclusion in this framework is one of its strengths (Rogers, 2003). Rogers incorporates the time dimension in different parts of his model. For example, in the innovation-decision process model, Rogers proposes that an individual passes through five stages. Finally, Rogers (2003) defines a social system as “a set of interrelated units that are engaged in joint problem-solving to accomplish a common goal” (p. 23). The social system affects the diffusion process, as it constitutes the boundary within which an innovation diffuses.

Rogers’ DOI framework has several sub-theories that together offer insight into how new ideas or objects are accepted (or rejected) by potential adopters. These sub-models include the innovation-decision model, the individual innovativeness model, the theory of rate of adoption, and the theory of perceived characteristics of innovations (PCI) (Rogers, 2003). This study draws only on the PCI model as empirical research has provided evidence that these characteristics influence the potential adopter’s decision (Moore & Benbasat, 1991; Morris & Dillon, 1997).

2.5.1 PERCEIVED CHARACTERISTICS OF INNOVATION

Some innovations diffuse from their first introduction to general use in a relatively short time. The internet is an example. In contrast, some innovations may take decades before their complete adoption (e.g. the car seat-belt) (Rogers, 2003). Rogers (2003), based on a survey of several thousand innovations, identified a set of innovation characteristics found to consistently influence adoption. According to Rogers (2003), potential adopters decide to adopt or not to adopt (reject) an innovation based on their perceptions of the innovation’s characteristics. These attributes as Rogers claims can thus help in predicting the rate of adoption of innovations. The perceived characteristics of an innovation are the subjective appraisal of an innovation, derived from the individuals’ personal experiences and perceptions. As such, it is the individuals’ perception of the innovation characteristics that affect its rate of adoption and not the objective characteristics of the innovation (Moore & Benbasat, 1991).

The characteristics identified by Rogers (2003) are relative advantage, compatibility, complexity, trialability and observability. Relative advantage is “the degree to which an innovation is perceived as being better than the idea it supersedes” (Rogers, 2003, p. 229). The relative advantage of an innovation, as perceived by an

individual, is positively related to its rate of adoption. Complexity is “the degree to which an innovation is perceived as relatively difficult to understand and use” (Rogers, 2003, p. 257). The complexity of an innovation is negatively related to its rate of adoption. The first construct, relative advantage, is comparable to the notion of PU of Davis’ TAM (1989). The second construct of complexity resembles the concept of PEOU of TAM. Compatibility is “the degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters” (Rogers, 2003, p. 240). This attribute is also positively related to the rate of adoption. Trialability is “the degree to which an innovation may be experimented with on a limited basis” (Rogers, 2003, p. 258). The trialability of an innovation is positively related to its rate of adoption. Observability is “the degree to which the results of an innovation are visible to others” (Rogers, 2003, p. 258). It is also positively related to the rate of adoption. In simple terms, an innovation is more likely to diffuse if potential adopters perceive it to be of observable benefits, compatible with the personal values, not complex and can be tried out before adoption.

Empirical research on the characteristics of innovations model supported its proposition that individuals’ perceptions about the attributes of an innovation significantly affect adoption behaviour (Moore & Benbasat, 1991). Tornatzky and Klein (1982) in a meta-analysis of 105 articles concerned with innovation characteristics and their relationship to innovation adoption and implementation identified ten attributes. These included the five attributes identified by Rogers. In their review, Tornatzky and Klein (1982) observed that some constructs lack specificity, therefore, they called for further conceptualisation of these constructs. In addition, they found that three innovation characteristics, namely compatibility, relative advantage and complexity had the most consistent significant influence on innovation adoption.

Moore and Benbasat (1991) adopted Rogers’ model to investigate the adoption of IT. They proposed seven constructs in their model. According to Moore and Benbasat (1991), the major attributes of an IT system that can explain its usage are relative advantage, complexity, compatibility, image, result demonstrability, visibility and trialability. Unlike Rogers (2003) who subsumed image under the construct of relative advantage, Moore and Benbasat (1991) hypothesised that image is an independent predictor of usage. Image is defined as “the perception that using an innovation helps enhance or improve the social status of a potential adopter” (Lu, Liu and Liao, 2005, p.192). Likewise, because Moore and Benbasat (1991) found Rogers’ observability to be tapping two distinctly different constructs, they divided this attribute into two separate constructs, result demonstrability and visibility. Result demonstrability implies the “degree to which the results of using an innovation are perceived to be tangible” (Lu et al., 2005, p. 192). Visibility is defined as “the perception of the actual visibility of the innovation itself as opposed to the visibility of outputs” (Lu et al., 2005, p. 192). Besides, Moore and Benbasat (1991) developed and validated, following a comprehensive process, fifteen scale items to measure their model’s constructs. This instrument has been used in numerous studies to examine innovations adoption

(Agarwal & Prasad, 1997; Karahanna, Straub, & Chervany, 1999; Jebeile & Reeve, 2003; Lu et al., 2005).

Agarwal and Prasad (1997) examined the effects of the innovations characteristics on current and future usage intentions of the World Wide Web. Their study found that only relative advantage ($\beta=.49$) and result demonstrability ($\beta=.34$) influenced intention to use in the future. The two constructs explained 46% of the variance in future use intention. Perceptions of compatibility were found to be the most important predictor of current usage ($\beta=.31$). The study further reported that perceptions of visibility ($\beta=.29$) and trialability ($\beta=.19$) were also important in explaining current usage; their influence on current usage was only marginally smaller than compatibility. These three attributes accounted for 48% of the variance in intention to use the WWW. The study also found lack of significance of relative advantage in predicting current usage, which is contradictory to other empirical research (Davis et al., 1989; Moore & Benbasat, 1991). Agarwal and Prasad (1997) argued that this result might be due to the high visibility of the WWW, which “engenders curiosity among potential adopters and creates a willingness to put the innovation into initial use, irrespective of any benefits it might offer” (p. 570). The results of their research validated and gave support to the influence of the characteristics of innovations on the adoption decision.

Likewise, Jebeile and Reeve (2003) examined the factors that influence the adoption and utilisation of the World Wide Web by teachers (N=75) for purposes of teaching preparation and teaching delivery. The model explained 73% of the variance in the first dependent variable (Web use for teaching preparation). The results indicated that relative advantage, results demonstrability, and trialability had a positive and significant influence on Web use for teaching preparation. Compatibility, image, visibility and ease of use did not emerge as significant in explaining Web use for teaching preparation. Moreover, in explaining Web use for teaching delivery, the model explained approximately 58% of the variation in the dependent variable. The results also indicated that compatibility, visibility, and ease of use had positive and significant relationship with Web use for teaching delivery.

Lu et al. (2005) adopted this model to predict individuals' intentions (N=137) to learn in an e-learning website. Their model comprised the seven innovation characteristics proposed by Moore and Benbasat (1991). Their results were consistent with prior research. The findings revealed that the impact of PCI on intentions to use e-learning website were different for those with and without e-learning experience. For users with prior experience of using e-learning, compatibility ($\beta=.58$) and result demonstrability ($\beta=.33$) significantly and directly influenced intention and accounted for 52% of its variance. However, for users with no previous experience using e-learning websites, compatibility ($\beta=.20$), image ($\beta=.27$), and relative advantage ($\beta=.83$) had significant, direct effect on intention and explained 58% of its variance. As such, relative advantage and compatibility have maintained the most frequent support as factors that influence the adoption of an innovation.

Compeau, Meister and Higgins (2007) extended the PCI model. Unlike Rogers' or Moore and Benbasat's model, which essentially hypothesises that each characteristic of the innovation influences usage directly, Compeau and her associates formulated a model that recognises the web of influences between PCI in addition to their influence on usage. In addition, Compeau et al. (2007) contend that Rogers' original definitions for the PCI were quite broad, encompassing several aspects within each category. Therefore, in their later conceptualisation, they separated some of the earlier proposed constructs into more precise elements. In particular, they have divided the construct of compatibility into three constructs as proposed by Karahanna, Agarwal and Angst (2006). Moreover, based on the conceptualisation of Moore and Benbasat (1991) and Tornatzky and Klein (1982), the researchers divided observability into three distinct constructs. Their findings supported the view of inter-relationships within PCI. Their complex model, however, explained only 15% of the variation in use intensity, with relative advantage having the largest total effect on use intensity ($\beta=.30$). The findings also showed that relative advantage is a summary judgment that mediates or partially mediates the effects of many other variables on use intensity.

Finally, in investigating the diffusion of e-learning adoption in China, Fu, Zhang, Mu, Zhang and Gao (2007) explored the factors affecting e-learning adoption behaviour. The result showed that the four perceived innovative attributes, namely relative advantage, compatibility, trialability and observability had influences on the peoples' adoption of e-learning. The study concluded that Rogers' theory provides a useful framework for examining e-learning acceptance behaviour.

2.5.2 LIMITATIONS OF DOI

The diffusion paradigm provides a broad direction for research that has helped building a cogent body of generalisations (Rogers, 2003). Although the research on DOI has provided significant insights into understanding diffusion and adoption behaviour (Rogers, 2003), this model, as well as its pertinent research, have been criticised. One of the shortcomings of the diffusion research is its pro-innovation bias. This refers to the implications in the diffusion research that an innovation must diffuse and be adopted by all members of a social system. This assumes a more serious issue of considering innovations and adopting them as positive while considering the act of rejection as negative. When adoption does not occur, it is considered a failure of the diffusion-adoption process, or nondiffusion rather than a stage of a process (Straub, 2009). This has led diffusion researchers to underemphasise studying the rejection, discontinuance and ignorance of innovations (Rogers, 2003). In addition, DOI has been criticised for not paying attention to the issue of inequality or the socio-economic gap that might result from the diffusion of innovations in any system (Rogers, 2003). An innovation spreads primarily amongst those already high in resources (Willis & Tranter, 2006) which further widens the gaps in society. Change agents and diffusion researchers often come in contact with and support the most responsive individuals to the innovation and this leads to more adoption among those individuals while others may not benefit as much as the former group. The inequality issue has been more evident in the developing

countries in Asia and Latin America (Melkote, 1991). The theory was criticised by some scholars as not being a suitable model for developing countries, but rather another tool to expand the “hegemony of the western world” (Melkote & Steeves, 2001). For example, Melkote (1991) considers the diffusion approach as a ‘message delivery system’ that “facilitates the process of modernisation via the delivery and insertion of new technologies, and/or inculcating certain values, attitude, and behaviours in the population” (Melkote & Steeves, 2001 p. 38). The writers see such ‘persuasive campaigns’ as “manipulative and potentially harmful” (p. 38).

2.6 SUMMARY

This chapter has offered an overview of the theoretical basis of this research. The research model is built on eminent theories that have been validated and found useful in explaining human behaviours. The first model was Fishbein and Ajzen’s (1975) TRA. TRA holds the view that individuals generally consider the consequences of their behaviours prior to the decision to undertake or not to undertake a particular action. The theory proposes that behaviour is a function of an individual’s BI to carry out that behaviour. BI is a function of two factors: one’s attitude toward performing the behaviour and SN regarding performing the behaviour. Empirical research has shown that the predictive utility of TRA is strong. However, TRA is confined to explaining behaviours that are under volitional control. The TPB proposed by Ajzen (1985) as a modified version of TRA to explain behaviours in which individuals have partial volitional control over behaviour. The modified theory encompasses a new construct termed PBC that refers to the person’s perceived ability to perform the behaviour of interest. According to TPB, individuals’ intention to perform behaviour is a combination of their attitude toward performing the behaviour, their SN and their PBC. TRA and its extension, TPB have been found to be robust in explaining a wide range of behaviour including the acceptance and adoption of ICT. Thus, these theories offer a useful framework to investigate the adoption of e-learning among university students. TAM was proposed by Davis (1989) specifically to explain technology acceptance and usage behaviours. TAM postulates that an individual’s acceptance and use of a technology is determined by his attitude. In addition, TAM posits that two attitudinal beliefs also have influence on the acceptance and usage behaviours, namely, PU and PEOU. However, PU (along with attitude) exerts a direct influence on behaviour while PEOU affects behaviour indirectly via PU. TAM has been applied to diverse technologies in numerous studies and has been found robust. Moreover, the current research draws on the PCI (Rogers, 2003). This model is one part of the well-known Rogers’ DOI framework (2003). Rogers (2003) postulated that the perceived characteristics of an innovation have an effect on its adoption. Rogers (2003) argued that these characteristics, thus, can provide an explanation of the rate of adoption of the innovation. There is rich literature confirming the influence of these characteristics on the adoption of innovations. The following chapter will detail how the theories reviewed in this chapter were adopted to build the research conceptual model.

3 CHAPTER THREE

RESEARCH MODEL

3.1 INTRODUCTION

The previous chapter has laid the basis for this research by discussing the theories that guided the development of the research model. The purpose of this chapter is to further provide a foundation for the study in terms of the selected constructs that form the research model. It will discuss in depth each construct and the relevant literature on it. The chapter will conclude with a description of the model and a summary.

3.2 RESEARCH ON THE ADOPTION OF E-LEARNING

E-learning is a relatively recent innovation, yet it has attracted substantial attention and research not only in education but also in other fields. Generally, research on e-learning has revolved around two areas: research on the impact of e-learning on the educational process or its effectiveness and comparing it to the traditional face-to-face mode of education (Piccoli, Ahmad, & Ives, 2001; Zhang, Zhou, Briggs, & Nunamaker, 2006) and research on e-learning environment design issues including human computer interaction (HCI), usability and design principles (Chang & Wang, 2008). Research on the factors influencing e-learning related variables such as adoption, acceptance, usage, satisfaction and continuance of use remains far less than on other research trends involving e-learning (Saadé, 2007; Lee, 2006; Jung, Loria, Mostaghel & Saha, 2008). Pituch and Lee (2006) noted that although e-learning systems are increasingly being used, only little theory-driven research examining the antecedents of e-learning adoption and use is available. The available literature offers merely rudimentary information about the students experiences (Harbeck, 2001) and their personalities (McManus, 2000; Diaz & Cartnal, 1999). Moreover, studies concerning Saudi students are even more difficult to locate. Therefore, there is a need to research the factors related to the adoption of e-learning. The aim of this research, thus, is to investigate factors influencing students' adoption of e-learning in a Saudi university. Understanding the factors that influence the adoption of e-learning will help to create a more favourable environment for successful adoption as well as assist in designing strategies to promote adoption (Ndubisi, 2004).

Broadly speaking, in researching factors influencing e-learning related behaviours such as acceptance, adoption and usage, four dimensions have been addressed: individual user, system characteristics, social pressure and institutional issues (Nanayakkara & Whiddett, 2005; Siritongthaworn, Krairit, Dimmitt & Paul, 2006). However, none of the reviewed studies combined these dimensions in one single research. Some researchers investigated the contribution of some selected characteristics of an e-learning system on the adoption and acceptance of e-learning (Fu et al., 2007; Masrom, 2007; Liao & Lu, 2008; Pituch & Lee, 2006; Hsbollah & Idris, 2009). For instance, Pituch and Lee (2006) extended TAM (Davis, 1989) to include

three system characteristics, namely system functionality, interactivity and response time. Their research investigated the impact of these system characteristics on 259 college students' intentions to use an e-learning system. The findings of this important study confirmed the suitability of TAM to study users' acceptance of new technologies. System characteristics, primarily, functionality, have had the strongest effect on users' intentions to use the system. All other system attributes, including TAM's core beliefs, were also important in shaping intentions.

Based on the Rogers' (2003) PCI model, Fu et al. (2007) investigated the adoption of e-learning among full-time undergraduates in China. They hypothesised that the five innovation attributes i.e. e-learning relative advantage, complexity, trialability, observability and compatibility could affect the level of e-learning adoption intention. The study findings revealed that the higher perceptions of relative advantage, compatibility, trialability and observability were, the higher the level of intention to adopt e-learning was. However, contrary to the theory and several earlier studies, perceived complexity of e-learning was not found significant.

In a very similar attempt, Liao and Lu (2008) used the extended PCI to study e-learning adoption. The results of the study were consistent with prior research in that relative advantage and compatibility exhibited the most significant relationships with adoption intention. Hsibollah and Idris (2009) investigated Malaysian university lecturers' perceptions of the decision to adopt e-learning as a teaching tool. Their study confirmed that the adoption decision was positively influenced by relative advantage and trialability. The other attributes were not significant.

Furthermore, the literature review revealed that some studies have looked at the role of several factors related to the user of e-learning (Wagner & Flannery, 2004; Chen & Chen, 2006; Abdel-Wahab, 2008). Self-efficacy and attitudes have been the most frequently addressed constructs from the individual dimension. For instance, computer self-efficacy was found significant in influencing intention to use e-learning (Pituch & Lee, 2006; Rezaei, Mohammadi, Asadi, & Kalantary, 2008).

Other researchers applied TRA (Fishbein & Ajzen, 1975) and TPB (Ajzen, 1985) which attribute a major role to the attitudes of the individuals in determining their intentions. Ndubisi (2004) applied this line of theory to investigate the adoption of a Blackboard system in a Malaysian university. Attitude was the most significant factor in determining the students' intentions to adopt the system. Mahmod, Dahlan, Ramayah, Karia and Hasmi (2005) investigated whether attitude was related to the adoption of an online MBA programme and further added several attitudinal beliefs to their model derived from Rogers' (2003) PCI. Their finding supported the importance of attitude in shaping adopters behaviour. The significant influence of attitude on intention to adopt e-learning has been further demonstrated in other studies (Wagner & Flannery, 2004; Gao, 2005; Ngai et al., 2007; Jung et al., 2008; Park, 2009). Nevertheless, the influence of attitude has not been consistent. Masrom (2007) reported that attitude was not significant in its impact on intention to use e-learning.

Moreover, in investigating e-learning adoption, some studies added a social dimension. In accordance with TRA (Fishbein & Ajzen, 1975) and TPB (Ajzen, 1985), social influence was investigated mainly in a generic sense. That is, the perceived pressure from ‘important others’ or ‘significant others’ has been studied (Ndubisi, 2006). Other studies, however, decomposed this construct into specific relevant groups such as course leaders, teachers, friends, colleagues and managers (Ma & Clark, 2003; Lee, 2006; Selim, 2007). Ma and Clark (2003) investigated online course acceptance by using a paired sample experiment involving both face-to-face versus online course instruction. Their findings revealed that perceived social pressure was stronger than the other factors in influencing intention. In investigating the use of the internet in university education in Hong Kong, Cheung and Huang (2005) found that social pressure in the form of perceived pressure from close friends and classmates was correlated with the use of the internet for university studies.

Only few of the scholars who investigated the adoption of e-learning at the micro-level have addressed the influence of the institutional dimension on the adoption decision (Cheung & Huang, 2005; Selim, 2007; Lau, 2007). Some authors argued that to have a successful implementation and usage of e-learning, ample access to technical advice, expertise and support is a critical success factor (Soong, Chan, Chua, & Loh, 2001). In this respect, Selim (2007) conducted a research to specify e-learning critical success factors as perceived by university students and listed university support as one key factor. Although, Selim’s study specified e-learning critical success factors by using the robust confirmatory factors analysis, the study did not test any structural model detailing the relationship between the critical factors and acceptance. Selim (2007)’s study tested only measurement models and thus his work is only a first step in understanding factors influencing students’ acceptance of e-learning.

The aforementioned studies have provided important theoretical and empirical contributions to the research on the adoption of e-learning by reemphasising the key roles of some system, user, social and institutional factors. Nevertheless, a few researchers, most notably Selim (2007) and Cheung and Huang (2005), have incorporated factors from the four main dimensions into their work. Selim (2007) noted that the adoption of e-learning is a complicated process that encompasses several aspects, therefore focusing only on one dimension may underestimate other factors that could influence adoption of e-learning. Thus, what is missing is a more comprehensive examination using a combination of factors related to the adoption of e-learning. The current study attempts to incorporate all these dimensions in investigating the factors influencing e-learning adoption.

Moreover, relatively little research has been done on investigating the factors that influence the adoption of new ICT outside the boundaries of the Western countries and specifically in the Arab region (Straub, Loch, & Hill, 2001; Nehari Talet, 2007), let alone, in the Saudi Arabian context. In fact, much of the available literature has focused on the perspective of faculty staff and administrators regarding web-based instruction. For example, Al-Fulih (2002) and Al-Mobarraz (2007) conducted research on the

factors influencing the adoption of the internet for academic purposes by Saudi university professors. The two studies adopted Rogers' (2003) PCI. While Al-Mobarraz (2007) found all the characteristics of the model to be significant predictors of the decision to adopt, Al-Fulih (2002) reported that only image, relative advantage, compatibility, ease of use and visibility were significant in explaining faculty adoption of the internet for academic purposes. In addition, two studies by Al-Harbi (2002) and Al-Ghonaim (2005) which investigated factors that influence the attitude of faculty and administrators toward online courses, revealed that some demographics (e.g. area of expertise, age, experience) were significant factors that influenced attitude towards online courses. Other factors, such as increased workload and lack of technical and administrative support, were found to be major barriers to online courses. Al-Saif (2005) investigated faculty usage of web-based instruction. He reported that certain demographics (age and academic rank) have a significant impact on usage. Additionally, his study uncovered such barriers to using web-based instruction as lack of skills, lack of support, poor infrastructure and lack of reward.

Such studies have been an invaluable help in illuminating our understanding of acceptance and use of web-based instruction within the Saudi tertiary education context; nevertheless, they are limited to assessing faculty and administration perspectives. They cannot offer a sound understanding of the genuine factors that may influence students in their decision to use e-learning (Cheung & Huang, 2005).

Little is known about the determinants of the successful adoption of e-learning in the Saudi context. One study, conducted by Al-Arfaj (2001) to investigate King Faisal University students' perspectives regarding distance web-based instruction, revealed that the students had a positive attitude toward web-based instruction because it is effective, convenient, interactive and can solve many problems associated with traditional face-to-face education in Saudi Arabia. Although the Al-Arfaj (2001) study is invaluable in that it provides information from the students' point of view, it lacks a theoretical framework and is descriptive concentrating only on three demographic variables.

Another study by Nehari Talet (2007) examined Saudi students' perceptions of the benefits and the efficient use of online teaching and learning (OTL). It showed that the students found OTL to be an efficient way of communicating with other students and a convenient form of education, especially for the employed and those with extensive commitments. In addition, the study found no difference between the students based on their GPA regarding the benefit of OTL. This study, however, is limited in terms of its sample for it only covered male students from technical colleges.

Although the studies by Al-Arfaj (2001) and Nehari Talet (2007) were concerned with students' perceptions, they were mainly descriptive and did not provide understanding of the factors influencing the students' decision to adopt e-learning. As such, there is still need for research focusing on the factors related to students' adoption of e-learning. Therefore, the purpose of the current research is to understand what factors influence the students' BI to adopt e-learning in a Saudi university. To answer

this question, the study proposes and assesses a model to explain the students' adoption of e-learning as a supplementary tool and for distance education. The following section will provide a discussion of the different constructs comprising the research model.

3.3 FACTORS INFLUENCING STUDENTS' ADOPTION OF E-LEARNING

The literature above has shown that there has been no research conducted to investigate the adoption of e-learning while addressing the different individual, social, system and institutional dimensions critical to the understanding of its adoption (Selim, 2007). Succi and Cantoni (2006) contend, "there is a relative lack of sound, rigorous models specifically focused on learners' acceptance and satisfaction with e-learning" (p. 912). Moreover, available Saudi literature has mainly focused on investigating acceptance and usage of e-learning from the perspective of instructors and administrators (Al-Harbi, 2002; Al-Gonaim, 2005; Al-Fulih, 2002; Al-Mobarraz, 2007).

Upon examining the relevant literature on the adoption and acceptance of internet and web-based education, various factors have emerged. In general, these factors can be grouped into four main categories: individual user, system, social and institutional (Succi & Cantoni, 2006; Siritongthaworn et al., 2006). Unlike earlier studies on the adoption of e-learning that addressed one or two of these dimensions, the model proposed in this research takes into account all these dimensions. The constructs representing the factors chosen are those found related directly to educational settings and specifically those pertinent to students.

3.4 DEPENDENT VARIABLE

3.4.1 *BEHAVIOURAL INTENTION TO ADOPT E-LEARNING*

Intention is a psychological construct that refers to an individual's motivation in the form of his or her conscious plan to exert effort to perform behaviour (Eagly & Chaiken, 1993, p. 168). The concept of intention occupies a central position in cognitive approaches to understanding human behaviour (Tubbs & Ekeberg, 1991). The concept has been tackled in social psychology research since the early 1950's (Dulany, 1962; Fishbein and Ajzen, 1975). Intention has commonly been viewed as the "conative" or behavioural component of the tripartite conception of attitude (Rosenberg & Hovland, 1960). Therefore, measures of attitude and intention have often been applied interchangeably to serve as indicator of a person's attitude (Fishbein & Ajzen, 1975). This view indicates the strong association between the two concepts.

Fishbein (1967) in his work to explain the weak relationship between attitude and behaviour distinguished between intention and attitude. Rather than being viewed as a part of attitude, intention is now regarded as an independent construct. Building on the work of Dulany (1961) to explain the role of awareness in verbal conditioning, Fishbein (1967) proposed that intentions to perform a particular behaviour (or behavioural

intentions- BI) are the proximal determinant of that behaviour. In TRA, Fishbein and Ajzen (1975) defined BI as “a person’s subjective probability that he will perform some behaviour” (Fishbein & Ajzen, 1975, p. 288). Moreover, the theory posits that an individual’s intention to perform a particular behaviour is determined jointly by his or her attitude towards performing that behaviour and his or her SN towards performing the behaviour. Subsequently, Ajzen (1985) added PBC as another primary determinant of BI. For example, a student’s intention to adopt e-learning is determined by his or her attitude toward adopting e-learning, his or her SN regarding adopting e-learning as well as his or her PBC over adopting e-learning.

There is empirical evidence supporting the links between BI and the research proposed independent variables, namely attitudes, SN and PBC. From a broader perspective, several meta-analyses of the literature on TRA and TPB offered a good support for these links (Godin & Kok, 1996; Albarracín et al., 2001; Armitage & Conner, 2001; Hagger, Chatzisarantis & Biddle, 2002). For a broad range of behaviours, attitudes correlate with intentions with a mean correlation ranging from 0.45 to 0.60, SN correlates with intention with a mean correlation ranging from 0.34 to 0.42 and PBC correlates with intention with a mean correlation ranging from 0.63 to 0.71 (Ajzen, 2005).

Moreover, a great deal of research has substantiated the predictive validity of intentions (Sheppard et al., 1988; Davis et al., 1989; Venkatesh & Davis, 2000; Ajzen, 2005). In a meta-analysis of 87 behaviours, Sheppard et al. (1988) found a frequency-weighted average correlation between intentions and behaviour of 0.53. Sun and Zhang (2006) in a meta-analysis of studies on user acceptance of technology have reported that 16 out of 17 studies considering the intention-behaviour link showed significant results. Intention has been found to be a better predictor of system usage than competing predictors such as realism of expectations, motivational force and satisfaction. Similarly, Jeyaraj, Rottman and Lacity (2006) analysed a rich body of research (99 studies) on the adoption and diffusion of IT-based innovations and reported an overall correlation between intention and future behaviour of 0.88.

However, sometimes there can be discrepancies between intentions and behaviours (Ajzen, 2005). For example, time can affect the individual’s intention to carry out an action. As time elapses, the likelihood that intentions are influenced by unforeseen events increases. Sejwacz, Ajzen and Fishbein (1980) reported a decrease in the correlation between intentions and behaviours over a two-month period from 0.72 to 0.47 respectively. Nonetheless, there is research to support the predictive validity of intentions over a 3-month period (Armitage, 2005). Largely, when an appropriate measure of intention is obtained it will provide the most accurate prediction of behaviour (Ajzen, 2005).

3.5 INDEPENDENT VARIABLES

3.5.1 *ATTITUDE TOWARD ADOPTING E-LEARNING*

Attitude is one of the most important concepts in social psychology (Manstead & Hewstone, 1995). Definitions of attitude have varied over time. However, much of the literature describes attitude in a single or tripartite account (Zanna & Rempel, 1988). The single perspective views attitude as an evaluative judgment of an object in terms of its degree of goodness or badness. Ajzen's (2005, p.3) definition of attitude as a "disposition to respond favourably or unfavourably to an object, institution or event", represents this view. The latter approach conceives attitude as including three components: affective, cognitive and behavioural (Kruglanski & Stroebe, 2005). Eagly and Chaiken (1993) provide the most contemporary definition of attitude consistent with this tripartite position, attitudes are "tendencies to evaluate an entity with some degree of favour or disfavour, ordinarily expressed in cognitive, affective and behavioural responses" (p. 155). The cognitive responses refer to beliefs, thoughts and ideas about the attitude object. The affective component refers to feelings, moods and emotions that people experience in relation to attitude objects. The behavioural or conative responses consist of the overt actions and BI that people display in relation to the attitude object (Eagly & Chaiken, 1993).

Attitude has been frequently used to explain human behaviours (Zimbardo, Ebbesen, & Maslach, 1977). However, numerous studies have found attitude to be a very poor predictor of actual behaviour (Wicker, 1969). In a classical study, LaPiere (1934) investigated racial prejudice by calling upon 251 restaurants and hotels accompanying a young Chinese couple, where they were denied service only once. About six months later, he sent a letter to each place visited, asking this question: "Will you accept members of the Chinese race as guests in your establishment?". Of the 128 places that responded, over 90% replied: "No". This inconsistency between attitude and behaviour has raised doubts about the assumption that attitude could be used to explain human actions. LaPiere's study and similar research findings have triggered extensive research to re-examine the concept of attitude and its relationship with behaviour (Ajzen & Fishbein, 1980). Among the several lines of research that attempted to resolve the feeble link between attitude and behaviour, is the pioneering work of Fishbein and Ajzen on attitude (1975, 1980).

The research of Fishbein and Ajzen (1975) focused primarily on understanding attitudes and predicting behaviour. Their work is of importance because it has given due attention to the study of the concept of attitude as well as its measurement. Moreover, their attitude theory has been validated extensively and proved robust (Davis et al. 1989). In their work, Fishbein and Ajzen (1975) made a major step in understanding attitude by distinguishing between beliefs, attitudes and intentions. Earlier, as defined above, attitude was seen as a multicomponent construct encompassing all the person's experiences with respect to an objective: beliefs, feelings and action tendencies. Ajzen and Fishbein (1975) adopted a unidimensional definition that restricts the concept of

attitude to the affective component only. Rather than considering beliefs (cognitive component) and BI (conation component) as parts of the concept of attitude, their theory defines these phenomena independently as concepts related to attitude. More specifically, beliefs and BI are viewed as determinants and consequences of an individual's attitude. Therefore, although attitudes are often said to include all three components, it is usually only evaluation or the "affective component" that is measured and treated by researchers as the essence of attitude (Fishbein, 1967, p. 479).

According to Ajzen and Fishbein (1980), attitudes toward any object are determined by beliefs about that object. Humans form beliefs about an object by associating it with various attributes; an attitude toward that object is acquired simultaneously and automatically. In other words, people will acquire a favourable attitude toward an object they believe has positive attributes, and they will have an unfavourable attitude toward an object they associate with negative attributes (Ajzen & Fishbein, 1980). Beliefs are learnt or formed from direct observation or information received from external sources or by means of inference processes. In other words, the individual relates the object with several attributes and forms beliefs about himself or herself, about other people, about institutions, behaviours, events, etc. (Fishbein & Ajzen, 1975). These beliefs work as the fundamental source of determining the individual's attitudes. that is the basic building blocks of attitudes (Ajzen & Fishbein, 1980).

Ajzen and Fishbein (1980) maintain that a person may have a great number of beliefs about an object, yet he or she can turn their attention at any given moment to only a relatively small number of beliefs which they termed salient beliefs. Moreover, like any other beliefs, salient beliefs may persist over time, forgotten or replaced by new ones. In this manner, attitude toward an object is based on an individual's salient beliefs about that object (Fishbein & Ajzen, 1975). An example is that a student's attitude toward adopting e-learning is a function of his beliefs about adopting e-learning. If these beliefs relate the behaviour with mainly favourable attributes and consequences, the student's attitude will tend to be positive. Conversely, a negative attitude will be held if the student associates adopting e-learning with unfavourable attributes and consequences.

Ajzen and Fishbein (1974) proposed that attitude influences behaviour indirectly through influencing BI to perform that behaviour. There is a strong empirical support for the reliability of attitude as a predictor of BI (Saadé, Tan, & Kira, 2008).

Numerous studies have adopted the concept of attitude to understand the adoption of new technologies such as e-learning. For instance, Lin and Lu (2000) studied students' acceptance of a web site using TAM. They found that attitude toward a web site (in the form of preference for the web site) had a strong influence on intentions to use it ($\beta=.40$). Liaw (2002a, b) in a study to develop and test a conceptual model of students' perceptions of web technology as a training tool argues, "no matter how sophisticated and how capable the technology, its adoption depends upon users having positive attitude towards it" (Liaw, 2002a, p. 18). His research concluded that when

students exhibit more positive attitudes toward a technology, they intend to use it. A study by Moon and Kim (2001) examining 152 Korean students' attitude toward the WWW has also echoed Liaw's finding. Attitude had a strong significant effect on BI to use the WWW ($\beta=.375$).

Ndubisi (2004) studied the impact of different factors on the adoption of a Blackboard system among 300 university students in Malaysia. Attitude had the greatest effect on intention to adopt the e-learning system ($\beta=.43$). It also mediates the effects of other beliefs (such as PU and PEOU) on intentions. In the context of using e-learning for public unemployment vocational training, Huang et al. (2006) examined 309 learners' acceptance of e-learning by applying TAM and found a significant impact of attitude on learners' BI to adopt e-learning ($\beta=.36$). Attitude was also found as a significant determinant of BI to adopt e-learning for Egyptian students who are similar to the students used in this study (Abdel-Wahab, 2008). Similarly, Park (2009) found attitude as a significant determinant of BI to adopt e-learning in Korea. Attitude was also significant in explaining students' intention to adopt Web 2.0 technologies to supplement in-class learning (Hartshorne & Ajjan, 2009). As such, a positive attitude towards e-learning is a prerequisite for its adoption (Liaw, 2002a). In other words, if students hold positive attitudes toward the technology, this will have a positive influence on their intention to adopt it (Peng, Tsai, & Wu, 2006; Park, 2009).

In this research, two behaviours are to be explained: adopting e-learning as a supplementary tool and adopting e-learning for distance education. Therefore, based on the theoretical and empirical literature discussed here, it is hypothesised that:

H1a: Attitude towards adopting e-learning will influence the students' BI to adopt e-learning as a supplementary tool.

H1b: Attitude towards adopting e-learning will influence the students' BI to adopt e-learning for distance education.

3.5.2 SUBJECTIVE NORM REGARDING ADOPTING E-LEARNING

Rogers (2003) describes the adoption process as mainly a communication process in which different forms of social influence are involved. If an individual believes that important people believe that he or she should perform certain behaviour, they may choose to perform it even if they do not hold a positive attitude toward the behaviour or its consequences (Ajzen & Fishbein, 1980). This type of social influence is termed Subjective Norm (SN) within the theoretical framework of Fishbein and Ajzen (1975). However, Ajzen and Fishbein's (1980) definition of SN is narrower than the view of norms found in Social Psychology. Norms as discussed by sociologists refer to a broader range of permissible behaviours or common standards and rules that are not necessarily obligatory (Eagly & Chaiken, 1993).

Ajzen and Fishbein (1980) define an individual's SN as "his perceptions that most people who are important to him think he should or should not perform the behaviour in question" (p. 57). The 'important others' in Ajzen and Fishbein's definition refers to the

individuals whose preferences about a person's behaviour in a particular domain are important to him or her (Eagly & Chaiken, 1993, p. 169). However, SN may or may not reflect what the important others actually think the individual should do. As proposed by TRA (Fishbein & Ajzen, 1975), the more an individual perceives that others who are important to him or her think they should engage in a behaviour, the more they will intend to do so, regardless of what the important referent really thinks regarding performing the behaviour. In other words, individuals are viewed as intending to perform the behaviours they think significant other people believe they should perform. In contrast, if they believe important others think they should not perform the behaviour, they will intend not to do so (Ajzen & Fishbein, 1980, p. 57).

There is a rich literature supporting the influence of SN on BI to perform behaviour (Moore & Benbasat, 1991; Finlay, Trafimow, & Moroi, 1999; Ma & Clark, 2003, Park, 2009). Within the context of e-learning, a study by Pan, Sivo, and Brophy (2003) reported that SN influenced the frequency of using WebCT. Ma and Clark (2003) also found SN to be a significant determinant of intention to use an online course. Similarly, Saadé et al. (2008) investigated perceptions and usage of students in an online course, found SN to be significantly, and positively associated with BI to use the online course. Moreover, Park (2009) found SN to be the strongest determinant of BI to adopt e-learning. SN was also significant in explaining students' intention to adopt Web 2.0 technologies to supplement in-class learning (Hartshorne & Ajjan, 2009).

However, research findings regarding the impact of SN on BI are inconsistent (Lutz, 1976; Davis, 1989; Mathieson, 1991). Yuen and Ma (2008) in a study to understand teacher acceptance of e-learning, found no significant impact of SN on intention. Miller, Rainer and Corley (2003) found similar results while investigating factors associated with the use of computers in the delivery of online learning. Venkatesh and Davis (2000) found that SN is significant only in mandatory settings and insignificant in voluntary contexts.

Although the effect of SN on BI is inconclusive, the rich empirical evidence regarding its strong impact on BI led to the formulation of the following hypotheses:

H2a: Subjective Norm will influence the students' BI to adopt e-learning as a supplementary tool.

H2b: Subjective Norm will influence the students' BI to adopt e-learning for distance education.

3.5.3 PERCEIVED BEHAVIOURAL CONTROL OVER ADOPTING E-LEARNING

Personal deficiencies and external obstructions can interfere with the execution of any behaviour (Ajzen, 2005). These factors correspond to the individuals' actual control or lack of control over a given behaviour. Successful performance of behaviour is contingent on the individual's control over the various factors that may inhibit it. Thus, the resources and opportunities available to an individual dictate in part the possibility of performing a particular behaviour (Ajzen, 1985; Bandura, 1986). Perceived

behavioural control (PBC) was the additional construct proposed by Ajzen (1985) to cater for explaining non-volitional actions. It is defined as “people’s perception of the ease or difficulty of performing the behaviour of interest” (Ajzen, 1991, p. 183). Specifically, PBC implies that, the existence of constraints can hamper intentions to perform behaviour and its actual performance. It is essential to note that it is the individual’s perception of control and not the actual control that he or she has over the behaviour that is measured in TPB.

Ajzen (1985) suggests that, control factors may be either internal (e.g., skills, abilities, power of will, compulsions) or external (e.g., time, opportunity, environmental constraints, dependence on others). Internal influences such as self-efficacy perceptions are suggested to be “based primarily on consideration of control factors that emanate from the person, rather than from external control factors” (Terry, 1993, p. 138); that is they relate to an individual’s internal abilities and constraints. External constraints on the other hand, are external to the person, i.e. they are situational and environmental factors such as support offered by others and the availability of necessary resources to perform the behaviour of interest. This line of reasoning has theoretical and empirical support in Psychology and ISM research.

PBC has been shown to have an effect on key dependent variables such as intention and behaviour in various domains (Ajzen, 1991). In addition, several meta-analyses have provided evidence of the impact of PBC on intention. For instance, Godin and Kok (1996) examined 76 TPB applications and reported a sample-weighted average correlation of 0.46 between PBC and intention. In their review, PBC predicted intention in 65 studies after controlling for TRA constructs, and explained an additional 13% of the variance on average.

Several researchers have applied TPB to technology-related behaviours and found PBC to be a significant determinant of intention (Mathieson, 1991; Taylor & Todd, 1995a). In an e-learning study, PBC was found significant in determining intentions to adopt a Blackboard system (Ndubisi & Chukwunonso, 2004; Ndubisi, 2006). Chia et al. (2006) examined the factors that affect intentions to adopt the internet among non-users in Singapore. The authors studied the effect of several internal and external control factors as predictors of individuals’ intentions to get online in the future. Their study found the control factors to be the most significant antecedents of BI to adopt the internet. This implies the critical role of PBC in determining their decision to go online. Lee (2009b) also found PBC to be an important determinant of BI towards e-learning system use continuance. Accordingly, this study hypothesises that:

H3a: Perceived Behavioural Control will influence the students’ BI to adopt e-learning as a supplementary tool.

H3b: Perceived Behavioural Control will influence the students’ BI to adopt e-learning for distance education.

3.5.4 *DEMOGRAPHICS AS MODERATORS*

Agarwal and Prasad (1999) indicated that studying individual differences factors is an important research stream in IT adoption. The term individual differences refers to “traits such as personality and demographic variables, as well as situational variables that account for differences attributable to circumstances such as experience and training” (Agarwal & Prasad, 1999, p. 362). There is a rich literature devoted to the investigation of the relationship between individual differences and IT adoption and acceptance (Zmud, 1979; Taylor & Todd, 1995b; Agarwal & Prasad, 1999; Sun & Zhang, 2006). Examples of individual differences researched in the technology adoption literature include gender (Gefen & Straub, 1997), age (Venkatesh et al., 2003), experience (Taylor & Todd, 1995a), intellectual capabilities (Hu et al., 1999); cultural background (Straub, Keil, & Brenner, 1997) geographic location (Ozdemir & Abrevaya, 2007); mode of study (Dorman, 2005); occupation (Choudrie & Dwivedi, 2006), marital status and family structure (Okazaki, 2005) and type of internet connection (Amoroso & Guo, 2006). These demographic variables have been found to play a direct, indirect or moderating role in relationships with variables such as technology acceptance, actual usage, satisfaction and persistence (Gefen & Straub, 1997; Morahan-Martin, 1998; Dabholkar & Bagozzi, 2002; Venkatesh et al., 2003; Yi, Wu, & Tung, 2005-2006). Users’ demographics can “alter the nature and importance of perceptions that explain technology use” (Segars & Grover, 1993, p. 525). In addition, from a theoretical point of view, concluding erroneously that certain demographics did not have any moderating effects on the relationships between the determinants of intention and intention, may preclude understanding the sources of any differential relationships across groups, hence, may lead to delay in the advancement of theory (Aguinis, 2004).

Despite the importance of the individual differences variables in explaining technology-related behaviours, they have been not given due attention in the technology acceptance and adoption models (Yi et al., 2005-2006; Agarwal & Prasad, 1999; Sun & Zhang, 2006). Only a few models have addressed the issue of how these demographics may directly influence intentions or moderate the relationship between intentions and other variables (Gefen & Straub, 1997; Venkatesh & Morris, 2000; Sun & Zhang, 2006; Branca, 2008). Taylor and Todd (1995b) noted that researchers have mostly taken a static view of the impact of the variables in acceptance models. Consideration of how the influence of those factors may change with the inclusion of some demographics has been of less interest. Thus, this research attempts to examine the effects of certain demographics on the links between the direct factors in the research model and BI. Based on the study of Venkatesh et al. (2003), two demographics have been hypothesised in this study so as to moderate the paths from attitude, SN and PBC to BI to adopt e-learning: gender and internet experience (IE). The other two moderating demographics suggested by Venkatesh et al. (2003): age and voluntariness are not included in the study because the sample of the study is relatively homogenous with regard to age of respondents and voluntariness of the context.

3.5.4.1 Gender

Gender is a significant social psychological construct that has been a topic of much investigation (Deaux & LaFrance, 1998). Although there is a debate about a gender gap in technology use and attitudes (Colley & Comber, 2003; Tsai, 2002; Schumacher & Morahan-Martin, 2001), this issue did not receive adequate attention in the research of technology adoption and diffusion (Gefen & Straub, 1997; Venkatesh & Davis, 2000; Ong & Lai, 2006). Extant research has reported differences between male and female in their adoption, perceptions, patterns of use and attitude towards educational technology (Zhou & Xu, 2007). Generally, research has found that men have more favourable attitudes towards computer technologies than women who generally experience greater computer anxiety and a lower degree of PU and PEOU (Keller, Hrastinski, & Carlsson, 2007).

Mitra et al. (2000) also found a direct relationship between gender and acceptance of technology. The researchers indicated that males had more positive perceptions toward computers and showed greater tendencies to use computers than females. Keller et al. (2007), however, found gender to influence acceptance but that, contrary to Mitra et al.'s (2000) study, men experienced a lower degree of performance expectancy or PU than women did. When Enoch and Soker (2006) examined students' use of web-based instruction at an open university, they found that there had been a continuous increase in internet use by both female and male students. However, the differences between the two sexes were still significant and quite large.

In an attempt to explore the possibility of gender difference in perceptions and relationships among determinants influencing e-learning acceptance, Ong and Lai (2006) found that gender differences were present in terms of computer self-efficacy, PU, PEOU and BI to use e-learning. Their study revealed that women were more strongly influenced by perceptions of computer self-efficacy and PEOU, and that men were more significantly influenced by their perception of the usefulness of e-learning. These findings were also confirmed by the research of Venkatesh and Morris (2000) who found that men's usage decisions were more strongly influenced by PU while women were more influenced by PEOU and SN. Other studies have revealed that women felt less competent and comfortable in using computers and the internet than men (Young, 2000; Schumacher & Morahan-Martin, 2001).

On a global scale, men are still the dominant users of the internet (Margolis & Fisher, 2003; Adya & Kaiser, 2005; Anderson, Timms, & Courtney, 2007). Morahan-Martin (1998) suggests some possible reasons for this difference such as cultural tendencies, sex role stereotypes, children's computer games, a male mystique surrounding computers, the hacker culture, and differences in socialisation towards both technology and computers.

Sometimes, the picture is different from what is described above. Although the internet has been considered as a male-dominated sector since its inception, women are increasingly using it. As a result, the gender gap on ICT usage and attitudes is diminishing (Rainer, Laoethakul, & Astone, 2003). Some studies have revealed a non-

significant difference between men and women in their perceptions and behaviour regarding technologies associated with the internet. For example, Gefen and Straub (1997) found that women and men differ in their perceptions of information technology, but only marginally. Their findings also revealed a small effect of gender on usage of technology. Tsai and Lin (2004) investigated Taiwanese students' attitudes towards the internet and found no significant difference in the affection and behaviour of using the internet between the sexes. Similarly, Leong, Ho and Saromines-Ganne (2002) in a study to examine students' satisfaction with web-based courses found that gender had no significant impact on overall student satisfaction with web-based courses. This result was also echoed by Chen and Lin (2002) who explored the factors influencing students' success in web-based courses and found that gender had no obvious influence on e-learning achievement.

Venkatesh et al. (2003) reported a moderating effect of gender on the links between performance expectancy, effort expectancy, social influence and facilitating conditions and BI to accept IT. Such moderating effect of gender has been also reported in other studies by Umrani and Ghadially (2008) and Zhang, Lee, Cheung and Chen (2009). Thus, this study hypothesises that:

H4a: Gender will moderate the effect of the three determinants of intention (attitude, SN and PBC) on BI to adopt e-learning as a supplementary tool.

H4b: Gender will moderate the effect of the three determinants of intention (attitude, SN and PBC) on BI to adopt e-learning for distance education.

3.5.4.2 Internet Experience

Previous research has shown that experience is a determinant of behaviour (Bagozzi, 1981). Fazio and Zanna (1981) argue that such influence is due to the role experience plays in making knowledge more accessible in memory. Individuals may employ the knowledge gained from their prior experience to form their BI because past experience can make low probability events more salient, in that way ensuring that they are accounted for in the formation of intentions (Fishbein & Ajzen, 1975; Eagly & Chaiken, 1993).

Within the internet domain, experience has been conceptualised and assessed in different ways (Liaw & Huang, 2003). For example, investigators have measured internet experience (IE) by the number of years an individual has been using it (Huang et al., 2006; Eastin & LaRose, 2000; Cheung & Huang, 2005); number of hours spent on it per week (Sam, Othman, & Nordin, 2005; Link & Marz, 2006); the applications to which it is put (Liaw & Huang, 2003; Sam et al., 2005; Link & Marz, 2006; Morahan-Martin & Schumacher, 2007b); or by a dichotomous yes or no answer to the question "Do you have IE?" (Ngai et al., 2007). Sometimes, researchers use another similar concept, internet skills, as a synonym of IE or internet literacy (Sun & Zhang, 2006).

Numerous studies found that experience with the internet or related technologies such as computers can be associated with BI to use, actual use, perceptions and

satisfaction of various internet applications (Taylor & Todd, 1995b; Tan & Teo, 2000; Schumacher & Morahan-Martin, 2001; Tsai, Lin, & Tsai, 2001; Arbaugh & Duray, 2002; Kim, Liu, & Bonk, 2005; Cheung & Huang, 2005). For instance, Liaw (2004) found that experience with the internet is significantly correlated with intention to use search engines as a learning tool. In a study of e-learning acceptance, Pituch and Lee (2006) found that the more experience students have in using the net, the greater their intention to use an e-learning system (Pituch & Lee, 2006).

Additionally, there is some empirical evidence that demonstrates the moderating effects of experience on the links between several constructs related to system or technology adoption and BI to adopt the system (Venkatesh et al., 2003). For example, experience was found to moderate the relationship between SN and BI, in that SN becomes less important with increasing levels of experience (Karahanna, Straub & Chervany, 1999; Venkatesh et al., 2003). Similarly, Taylor and Todd (1995b) assessed IT usage, applying TAM with prior experience taken as a determinant of usage. The researchers tried to assess if TAM could explain usage for inexperienced users and if the determinants of IT usage are the same for experienced and inexperienced users. Their study showed that there were significant differences in the relative influence of the determinants of usage depending on experience. In particular, inexperienced users intentions were better predicted by the antecedent variables in the model than were the intentions of experienced users. Thus, the following hypotheses are tested:

H4c: IE will moderate the effect of the three determinants of intention (attitude, SN and PBC) on BI to adopt e-learning as a supplementary tool.

H4d: IE will moderate the effect of the three determinants of intention (attitude, SN and PBC) on BI to adopt e-learning for distance education.

3.5.5 ATTITUDINAL BELIEFS

Research has established and validated the role of system characteristics in determining user's attitudes towards technology acceptance (Moore & Benbasat, 1991; Pituch & Lee, 2006). Rogers (2003) argued that the characteristics of an innovation are one important explanation of its rate of adoption. TAM (Davis, 1989) postulates that system characteristics directly affect user's attitudes towards technology acceptance. In this study, four characteristics were hypothesised to influence attitude towards adopting e-learning. Two characteristic, namely PU and PEOU, were adopted from TAM (Davis, 1989). Ample empirical research has found the two system attributes reliable in explaining attitudes towards acceptance of technology. The two other e-learning system perceived characteristics proposed in this study along PU and PEOU are perceived e-learning flexibility (PF) and perceived e-learning interactivity (PI). These two attributes were identified by university students during the focus group study which will be described in detail in the next chapter.

3.5.5.1 Perceived Usefulness

As discussed in the previous chapter, Davis (1989) proposed TAM to provide a theoretically justified explanation of the determinants of IT acceptance across a wide range of IT applications and user populations. To reiterate, TAM theorises that system acceptance and use is determined by BI, which is in turn determined by the individual's perceptions of system usefulness as well as his attitude toward using it (Davis, 1989). The theory proposes that PU has an impact on attitude in that positively valued outcomes are expected to increase one's affect toward the behaviour (Vroom, 1964).

PU is defined as "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis, 1989, p. 320). PU is similar to the construct of relative advantage suggested by Rogers in his PCI model (Moore & Benbasat, 1991). A system that is useful in performing the required tasks will allow the user to achieve better performance and benefit from its use (Davis, 1989).

PU signifies the individual's extrinsic motivation to use a technology (Arbaugh, 2002a). Davis (1989) developed the construct of PU based on several streams of research including system utilisation study (Robey, 1979), applied expectancy theory (DeSanctis, 1983), cost-benefit analysis research, relative advantage in innovation adoption (Tornatzky & Klein, 1982; Rogers, 1962, 2003), evaluation of information reports (Larcker & Lessig, 1980) and channel disposition model (Swanson, 1982).

PU has been consistently found to be a strong predictor of BI to accept and use a technology (Davis et al., 1989) as well as of attitudes towards a technology (Davis, 1989; Lin & Lu, 2000; Ndubisi, 2004; Ngai et al., 2007). For example, King and He (2006) conducted a meta-analysis of the Technology Acceptance Model as applied in various fields using 88 published studies. The results showed the influence of PU as profound. Several studies conducted on the use of online educational systems have also reported the importance of PU in explaining attitude towards their adoption (Ndubisi, 2004; Ong, Lai, & Wang, 2004; Gao, 2005; Mahmud et al., 2005; Pituch & Lee, 2006; Ngai et al., 2007; Jung et al., 2008; Park, 2009; Al-Somali, Gholami & Clegg, 2009; Lee, 2009b).

For university students, e-learning offers opportunities to enhance the educational process and to increase access to learning (Khan, 2007). Higher levels of PU lead to more favourable attitudes towards e-learning (Ndubisi, 2004; Mahmud et al., 2005). Thus, if the student perceives that e-learning provides easy access to the course materials, for instance, he or she may have a positive attitude to adopt it, which in turn would lead to a stronger intention to adopt the system (Ndubisi, 2004).

In investigating the acceptance of a website, Lin and Lu (2000) found PU to be a strong determinant ($\beta=.38$) of attitude towards the website. PU was also a significant antecedent ($\beta=.31$) of attitudes towards acceptance of WWW (Moon & Kim, 2001). In a distance learning environment, Lee, Cho, Gay, Davidson and Ingraffea (2003) found a strong direct influence of PU of new collaboration technology on attitude. Learners' attitudes toward the courseware were mainly based on how useful they felt it was in

completing tasks efficiently. When learners had goal-oriented performance expectations, they formed positive attitudes through their perceptions of the usefulness of the technology. Ndubisi (2004) reported similar findings in his investigation of the factors influencing the adoption of Blackboard by 300 Malaysian university students.

Moreover, Mahmud et al. (2005) in a study to investigate students' intentions to adopt an e-MBA in Malaysia found relative advantage, a similar construct to PU, a significant determinant of attitude. Huang et al. (2006) explored learners' acceptance of e-learning as a training tool for unemployment. Their study indicated that PU was the most important critical success factor for the e-learning training system ($\beta=.55$). Ngai et al. (2007) investigated factors influencing the adoption of WebCT by 836 university students in Hong Kong using a structural model based on TAM. Their results showed that PU was the dominant factor affecting the attitude of students ($\beta=.75$). More recently, these findings were echoed by a study in Sweden by Jung et al. (2008) and in Korea (Park, 2009).

As such, learners who perceived the technology to be useful had a more positive attitude toward using it. Based on this argument, the following hypothesis is postulated:

H5a: PU will influence the students' attitudes toward the adoption of e-learning.

3.5.5.2 Perceived Ease Of Use

Davis (1989) defined Perceived Ease of Use (PEOU) as "the degree to which a person believes that using a particular system would be free from effort" (Davis, 1989, p. 320). PEOU represents an individual's intrinsic motivation to use a technology (Arbaugh, 2002a). Perceptions of the ease of use of a system have been shown to exert influence on attitude towards acceptance of the system (Davis, 1989; Rogers, 2003). Empirical research has supported this proposition (Davis et al., 1989; Venkatesh et al., 2003; Ong et al., 2004; Gao, 2005; Ndubisi, 2006; Ngai et al., 2007; Jung et al. 2008; Park, 2009; Lee, 2009a).

However, Lee et al. (2003) conducted a meta-analysis of 101 TAM articles covering the period from 1986 to 2003. They found that PEOU was unstable in predicting intention or behaviour. Moreover, PEOU was found to be a significant determinant of PU, rather than an analogous, direct antecedent of acceptance, and thus it can affect indirectly the acceptance through PU. This is also reported in a number of studies that adopted TAM (Venkatesh & Davis, 2000; Gao, 2005; Martínez-Torres et al., 2008; Premkumar & Bhattacharjee, 2008). Hwa (2007) argued that such inconsistency in the results relating to the PEOU construct may stem from lack of focus on specific tasks or aspects when studying users acceptance and adoption of the 'multi-tasks and multi-tools' internet-based systems. She further contends that some tasks, such as accessing course content, may be perceived differently from other tasks such as communicating and collaborating with others.

Another explanation for the inconsistent impact of ease of use in technology acceptance research is users' familiarity with these technologies. While PEOU might

initially influence pre-usage intention, this effect is likely to diminish with time as users become familiar with the technology and skilled in using it. The impact of ease of use may also hinge on the type of technology being investigated. Although exploiting the resources and tools of a technology requires knowledge of a novel set of skills, if users are shown to have some experience with the technology, they will not be troubled when using a new system and thus perceived ease of using the technology is not important (Koufaris, 2002; Gao, 2005; Kim, Choi, & Han, 2009).

PEOU has been sometimes found stronger than PU in influencing attitude. For instance, in investigating intentions to accept a website, Lin and Lu (2000) found PEOU a stronger determinant ($\beta=.48$) of preference for a website than PU. Moon and Kim (2001) found PEOU the World Wide Web to exert greater weight ($\beta=.41$) in determining attitude than PU. They argue that the intrinsic motivational factors (i.e. PEOU of a technology) can sometimes have a more powerful effect than extrinsic factors in building a positive attitude.

A significant impact of PEOU was also found in studies focused on the adoption of e-learning. For example, Ndubisi (2004) examined university students' adoption of Blackboard in a Malaysian university. He found PEOU to be a significant determinant of attitude. In a similar vein, Huang et al. (2006) investigated learners' acceptance of e-learning for public unemployment vocational training and reported that PEOU has a positive effect on attitudes towards using e-learning. Similarly, Ngai et al., (2007) in studying WebCT adoption, found that PEOU is a key factor influencing attitude and system usage. Recently, Jung et al. (2008) and Park (2009) applied TAM in investigating students' use of an e-learning system. These studies found further evidence of the significant influence of PEOU on attitude towards using e-learning. As Davis (1989) argued, if the technology is perceived as easy to use, positive attitudes will be formulated by the potential user. Technologies that are easy to use will be accepted and used more than those that are complex (Davis, 1989; Rogers, 2003). E-learning may be of tremendous educational potential, but if learners cannot control effectively the learning environment, the system will soon lose its appeal (Bates, 2005). Thus, the following hypothesis is posited:

H5b: PEOU will influence the students' attitudes toward the adoption of e-learning.

3.5.5.3 Perceived Flexibility

E-learning has the potential to improve learning experiences through increased flexibility (Wong Wai, 2002). The concept of e-learning flexibility (PF) can be applied with regard to "time, content, entry requirements, instructional approach and resources, and delivery and logistics" (Collis & Moonen, 2001, p. 10). The flexibility characterising e-learning, as Wong Wai (2002) explained, offers learners greater control and choice over what and how they learn at their own time, pace and place; helps them to take responsibility for their learning; and provides support appropriate to their individual needs. This flexibility is particularly attractive for some types of learners

such as the full-time workers or busy people. Within the Saudi context, e-learning flexibility can encourage some groups of students such as the young married women or rural students to pursue their studies with greater convenience than the conventional way of learning would allow. The time and place independence available through e-learning tools permits students to have a high degree of flexibility for when and where they participate in internet-based courses. In addition, e-learning has offered both the instructors and their students greater flexibility of communication and interaction. The educational community is untied by time and geographic constraints (Meredith & Burkle, 2006).

Several studies that examined perceptions of students towards e-learning found flexibility to be the most important valuable aspect of online learning (Kim et al., 2005; Yaghoubi et al., 2008). In a study by Jain and Ngoh (2003) on the motivating factors that influence part-time students participating in web-based courses, flexibility ranked as the main motivating factor. Other studies found that flexibility was strongly related to satisfaction with online courses (Arbaugh, 2000a; Arbaugh & Duray, 2002; Sun, Tsai, Finger, Chen, & Yeh, 2008). Pituch and Lee (2006) studied the impact of 'system functionality' on intentions to use an e-learning system. They defined functionality as "the perceived ability of an e-learning system to provide flexible access to instructional and assessment media" (p.225). They found that system functionality to have a significant effect on intentions to use e-learning. Hao (2004) examined students' attitudes and satisfaction with an on-line course and reported that flexibility determined students attitude towards online courses. The main reason for the students to take the online courses was the flexible scheduling which online learning affords. Thus, this hypothesis is postulated:

H5c: PF will influence the students' attitudes toward the adoption of e-learning.

3.5.5.4 Perceived Interactivity

Interaction is a critical activity of any educational environment because it helps the development of cognitive skills and the acquisition of knowledge (Moore, 1993; Jonassen et al., 1995; McIsaac, Blocher, Mahes, & Vrasidas, 1999; Angeli, Valanides, & Bonk, 2003). This is true whether the environment is classroom-based, internet-based or blended (Woo & Reeves, 2007). In any educational context characterised by time and space separation, high levels of interaction are even more necessary for the success of the learning process (McIsaac et al., 1999; Garrison & Anderson, 2003). In internet-based education the interaction that occurs between students and teachers, as well as between groups of students, is crucial in motivating discussion and providing a desirable impetus for students who sometimes feel isolated (McIsaac et al., 1999).

Interactivity is a central issue in the context of e-learning (Bates, 2005; Wong Wai, 2002). E-learning provides a diverse range of tools that allow and enhance interactivity. In fact, interactivity is the key difference between the new and traditional media. Unlike earlier technologies such as TV or CD, the capabilities of the internet permit interactivity or two-way communication. For example, some e-learning tools

permit real-time or simultaneous communication (synchronous) while others allow communication that can be stored and accessed in delayed time (asynchronous). A powerful feature of e-learning is its capacity to allow such a 'two-way communication' between the student and the teacher and other students. Thus, interactivity is the key *raison d'être* for the wide adoption of the internet for teaching and learning (Bates, 2005).

Interactivity has been the focus of a considerable amount of research that has defined this concept differently and examined it from multiple dimensions (Angeli et al., 2003; Bates, 2005; Woo & Reeves, 2007; Chang & Wang, 2008). Some researchers defined interactivity as "the extent to which the communicator and the audience respond to each other's communication need" (Ha & James, 1998, p. 457). Williams, Rice and Rogers (1988) maintain that interactivity can be defined as a three-dimensional construct including control, exchange of roles and mutual discourse. Likewise, Neuman (1991) referred to interactivity as the "quality of electronically mediated communications characterised by increased control over the communications process by both sender and receiver" (p. 104). Moore (1993) identified three types of interaction in a distance education environment: learner-instructor interaction, learner-learner interaction, and learner-contents interaction.

Some researchers investigated the impact of interactivity of a system on performance and satisfaction in online systems. Zhang et al. (2006) empirically examined the influence of interactive tools on learning outcome and learner satisfaction in e-learning environments. They conducted an experiment in which four different settings were studied. Three settings were e-learning environments with interactive video, with non-interactive video, without video; and the fourth setting was a traditional classroom environment. Their study showed that the value of video for learning effectiveness was contingent upon the provision of interactivity. Students in the e-learning environment that provided interactive video achieved significantly better learning performance and a higher level of learner satisfaction than those in other settings. Students who used the e-learning environment that provided non-interactive video did not improve. Indeed, interactivity can be a valuable means to improve learning effectiveness in e-learning environments.

Other investigators studied how interactivity influenced beliefs and acceptance of educational technologies (Hsu & Lu, 2004; Chang & Wang, 2008). Pituch and Lee (2006) studied the influence of interactivity on students' intentions to use e-learning. They found that e-learning PI had the strongest effect on PU. Learners who indicated that the system allowed for more effective interaction between learners themselves and learner and teacher perceived e-learning as a useful system. Moreover, interactivity influenced intention to use e-learning. That is, when learners believe that the system provides effective student-student and student-instructor interaction, they will be more likely to use e-learning. Similarly, Chang and Wang (2008) investigated interactivity and how it influenced PU and PEOU in a computer mediated environment. They found strong relationships between interactivity and PU and PEOU. In particular, increased

levels of interactivity will lead to increased levels of PEOU and PU. Their study confirmed the positive effects of interactivity on the acceptance of IT.

There is also empirical evidence regarding the positive effects of the interactivity of a website on attitude toward the website (Hwang & McMillan, 2002; Jee & Lee, 2002). Wu (1999) found that perceived interactivity to have a positive influence on attitudes toward the web sites, attitudes toward the brand, and purchase intention. Similarly, Jee and Lee (2002) studied antecedents and consequences of interactivity of a web site. They reported that attitude was significantly influenced by PI. Therefore, the following hypothesis is proposed:

H5d: PI will influence the students' attitudes toward the adoption of e-learning.

3.5.6 NORMATIVE BELIEFS

According to Ajzen and Fishbein's theory (1975), SN is a function of beliefs, specifically normative beliefs. Normative beliefs are concerned with "the likelihood that important referent individuals or groups would approve or disapprove of performing the behaviour" (Ajzen & Driver, 1991, p. 187). As such, they correspond to perceptions of important others' preferences about whether a person should perform behaviour. In forming SN, an individual takes into consideration the normative expectations of various others in her or his environment. Normative beliefs are similar to SN, except that they involve particular individuals or groups rather than a generalised important other (Ajzen & Fishbein, 1980). Thus, normative beliefs may originate from peers, family, instructors or other relevant social groups, and may take the form of social support or social pressure (Mathieson, 1991; Ma & Clark, 2003; Ndubisi, 2004).

Several studies have investigated the influence of various referent groups or normative beliefs on forming SN and on BI (Mathieson, 1991; Taylor & Todd, 1995a; Ma & Clark, 2003; Ndubisi, 2004; Zolait & Sulaiman, 2008). The belief constructs were found to influence BI directly (Davis et al., 1989; Ndubisi, 2004), or indirectly via SN (Ajzen, 1991; Taylor & Todd, 1995a; Ndubisi, 2006). However, while some IT research has not found them to be significant (Mathieson, 1991), others have reported a significant effect (Hartwick & Barki, 1994; Ndubisi, 2006; Lee, 2009b).

Taylor and Todd (1995a) highlighted the importance of decomposing SN into its salient normative beliefs, as there might be divergence of opinions among the referent groups. For example, a student might believe that her instructor thinks that she should use e-learning and at the same time, her family thinks she should not. In this case, a "monolithic normative structure may show no influence on SN or intention because the effects of the referent groups may cancel each other out" (Taylor & Todd, 1995a, p. 152). Examples of research that have studied decomposed normative beliefs include Mathieson (1991) who studied the influence of peers, instructors and employers; Taylor and Todd (1995a) who assessed the influence of peers and professors; Ndubisi (2004) who studied course leader influence, and Ma and Clark (2003) who investigated the influence of peers, colleagues and boss.

Following these studies, in this research the construct of SN was decomposed into its salient normative beliefs as suggested by Ajzen and Fishbein (1975) and Taylor and Todd (1995a). In order to specify the relevant normative beliefs or referent groups for the students, an elicitation study was conducted as will be described in the following chapter. The important referent groups identified by the students of the online focus group study included peers, family and instructors. Hence, the following hypotheses are posited.

3.5.6.1 Peer's Belief (PB)

H6a: PB will influence the students' SN regarding the adoption of e-learning.

3.5.6.2 Family's Belief (FB)

H6b: FB will influence the students' SN regarding the adoption of e-learning.

3.5.6.3 Instructor's Belief (IB)

H6c: IB will influence the students' SN regarding the adoption of e-learning.

3.5.7 CONTROL BELIEFS

Several factors can help or hinder the adoption of e-learning. In this research, three control beliefs or factors are identified as PBC antecedents namely, internet self-efficacy, perceived accessibility of e-learning and university support. In essence, the absence of these factors represents barriers to e-learning adoption and may inhibit the formation of intention. Equally, the presence of high levels of the control factors would encourage the adoption of e-learning.

3.5.7.1 Internet Self-efficacy

As discussed in the previous chapter, by taking efficacy expectancies into consideration TPB (Ajzen, 1985) differs from TRA (Fishbein & Ajzen, 1975; Ajzen & Fishbein, 1980). Ajzen, (1985) describing the difference between the two theories, argued,

The two theories are identical when the subjective probability of success and the degree of control of internal and external factors reach their maximum values...When subjective probabilities of success and actual control are less than perfect; however, we enter the domain of Planned Behaviour (p. 36).

Ajzen (2002) contends that PBC is 'quite similar' to Bandura's construct of self-efficacy, but only when the latter is defined in relation to the performance of specific behaviours (p.668). The concept of self-efficacy was identified by Bandura (1977) within his social cognitive theory. Perceived self-efficacy refers to "beliefs in one's capabilities to organise and execute the courses of action required to produce given attainments" (Bandura, 1997, p. 3). Perceived self-efficacy is not an assessment of the skills one possesses but a belief about what one can do in different conditions with

whichever skills one has. Unless individuals believe they can produce wanted effects by their actions, they have little motivation to act or to persist in the face of obstacles (Bandura, 2006c). Bandura (2006c) argued that “whatever other factors serve as guides and motivators, they are rooted in the core belief that one has the power to effect changes by one’s actions” (p. 170).

The efficacy belief is an important personal resource in personal development (Bandura, 1997). It operates by influencing cognitive, motivational, affective and decisional processes. Moreover, self-efficacy affects whether a person believes optimistically or pessimistically, in self-improving or self-debilitating manners. Such beliefs also influence individuals’ goals and aspirations, how much effort they may put forth in certain endeavours and how long they will persevere in the face of difficulties and failure.

Efficacy beliefs determine the individuals’ outcome expectations, i.e. whether the effort will yield favourable or unfavourable outcomes (Bandura, 2006c). For instance, individuals who doubt their abilities in a particular domain of activity withdraw from difficult tasks in such domains. It is hard for them to be motivated in such situations because they have low aspiration and little commitment. In contrast, a resilient sense of efficacy improves socio-cognitive functioning in a particular domain. That is, an individual who believes strongly in his capabilities will approach difficult tasks as challenges to be overcome rather than risks to be avoided (Bandura, 1997). Perceived self-efficacy is, therefore, one key factor governing adoption of innovations (Bandura, 2006b).

The concept of self-efficacy has been extensively investigated in diverse fields and has gained support from an increasing volume of research from varied disciplines (Pajares, 1997). Self-efficacy has been found to have influence on intention (Ajzen & Madden, 1986; deVries & Backbier, 1994), goal choice and task performance (Locke, Frederick, Lee, & Bobko, 1984), academic performance and persistence (Multon, Brown, & Lent, 1991), motivation (Zimmerman, Bandura, & Martinez-Pons, 1992), academic achievement (Eachus, 1993; Eachus & Cassidy, 1997; Cassidy & Eachus, 2000) and computer use (Cassidy & Eachus, 2000).

Bouffard-Bouchard (1990) tested how perceived self-efficacy influenced cognitive task performance among 64 Canadian college students. Their study revealed that students with high perceptions of self-efficacy, induced by positive feedback, completed more problems, had more efficient problem-solving strategies, and accurately self-evaluated responses.

In the context of the internet, Bandura (2006a) stressed the importance of this concept to effective use of the internet:

The internet provides an avalanche of information in diverse sources of varying quality. It requires a robust sense of efficacy and self-directive capabilities to access, process and evaluate the glut of information. Individuals who are assured in their efficacy to manage the internet

technology are the ones who take advantage of this expansive environment (p. 119).

Using the internet necessitates the acquisition of a set of skills that, to the novice user, may be daunting, such as establishing internet connection, navigating on the internet and searching it for relevant information (Eastin & LaRose, 2000). Internet self-efficacy (ISE) is defined by Eastin and LaRose (2000) as “the belief that one can successfully perform a distinct set of behaviours required to establish, maintain and utilise effectively the internet”. Eachus and Cassidy (2006) suggest that in order for students to gain maximum benefit from on-line learning, it is important that educators know something of their students’ internet perceived capabilities or ISE before they embark on this form of learning. In this way, educators can identify those students who would probably become frustrated, as they are not yet prepared for on-line learning.

Prior research has shown that self-efficacy is an important factor that influences the adoption of various technologies (Compeau & Higgins, 1995a; Taylor & Todd, 1995a; Compeau, Higgins, & Huff, 1999; Venkatesh, 1999; Tan & Teo, 2000; Joo, Bong, & Choi, 2000; Hsu & Chiu, 2004). Compeau and Higgins (1995a) studied the role of beliefs about individuals’ abilities to use computers competently (computer self-efficacy) in the determination of computer use. Their study revealed that self-efficacy plays an important role in shaping individuals’ feelings and behaviours. Computer self-efficacy was found to exert a significant influence on individuals’ expectations of the outcomes of using computers, their emotional reactions to computers (affect and anxiety), as well as their actual computer use. In other words, individuals with high self-efficacy used computers more, derived more enjoyment from their use, and experienced less computer anxiety. Similarly, computer self-efficacy has been also found as the only significant predictor of intention to participate in a web-based distance education course (Lim, 2001). Likewise, Rezaei et al. (2008) found a strong significant relationship between computer self-efficacy and intentions to use an e-learning system.

Hsu and Chiu (2004) studied users acceptance of an e-service by investigating the influence of self-efficacy, specifically, ISE on users acceptance. The researchers distinguished two types of ISE, general and Web-specific. The findings revealed that both forms of ISE were found to play important roles in shaping individuals’ behaviour. The study found that the relationship between Web self-efficacy and BI was significant. In addition, the result indicated that general ISE had a significant influence on attitude toward the e-service usage. The result also showed that Web self-efficacy had a significant direct effect on e-service usage, whereas general ISE had an indirect effect on e-service usage through Web self-efficacy, attitude and intention.

Tsai and Tsai (2003) explored students’ information searching strategies in Web-based science learning activities and the influence of students ISE on these strategies. The results showed evidence that high ISE students had better information searching strategies and learned better than those with low ISE in a Web-based learning task. In a similar attempt, Hsu, Chiu and Ju (2004) investigated users’ intentions to continue using the WWW. Their study proposed ISE as one determinant of intention to continue using

the Web. The results of their study confirmed this hypothesis with a significant influence of ISE on intention. Eastin and LaRose (2000) found that ISE was positively related to internet usage.

The concept of self-efficacy is concerned with judgments of how well one can execute courses of action required to deal with prospective situations (Bandura, 1986). Self-efficacy beliefs can affect choice of activities, preparation for an activity, effort exerted during performance and emotional reactions (Ajzen, 1991). In this respect, it is related to the construct of PBC proposed by Ajzen (1985). The more the person perceives that he or she is capable of performing behaviour, the greater control over this behaviour he or she will have. Thus, self-efficacy is one dimension of PBC (Ndubisi, 2004). Accordingly, this hypothesis is tested:

H7a: ISE will influence the students' PBC over adopting e-learning.

3.5.7.2 Perceived Accessibility

One of the goals of e-learning is to increase access to education for a wider spectrum of learners (Khan, 2007; Singh, O'Donoghue, & Worton, 2005; Du, 2004). However, enjoying the benefits of e-learning is not possible unless the student has adequate and affordable access to computer and internet technologies (Siritongthaworn et al., 2006). As such, lack of access to computers and internet technologies is considered a major hurdle for students and educators to overcome (Henderson & Stewart, 2007; Daugherty & Funke, 1998). Although the issue of access is essential in e-learning (Dhanarajan, 2001; Kearsley, 2000), there is a general misconception that all students have ready access to e-learning (Johnson & DeSpain, 2001). Lack of consideration for this issue prior to implementing e-learning may lead to its rejection when students have difficulty in accessing e-learning or have to pay a higher cost to access the system (Du, 2004; Singh et al., 2005). This possible outcome contradicts the original intention of e-learning as an enabler of education.

Bates (1995) developed and later refined (Bates & Poole, 2003; Bates, 2005) the ACTION model for selecting and applying technology in education. His model suggests some issues that need to be addressed in any educational setting incorporating technology. The model aims at facilitating decisions with regard to choice of technology at both the strategic and the tactical level. Bates and Poole (2003) placed the issue of access first in the criteria list of the ACTION model. They contend rightly that,

No matter how powerful in educational terms a particular technology may be, if students cannot access it in a convenient and affordable manner they cannot learn from it. You may believe that video streaming is the best way to get your great lectures to students off campus, but if they do not have internet access at home or if it takes four hours to download, then forget it (p.81).

Bates and Poole (2003), therefore, call for caution in making assumptions about students access to computer technology. It is not enough to know if students have a

computer and internet access at home, but also whether they have access to high-speed and reliable connection.

Accessibility has been found to be a key determinant of IT usage and acceptance (Rice & Shook, 1988; Hiltz, 1983; Svenning & Ruchinskas, 1984; Culnan, 1984; Culnan, 1985). In internet-based learning contexts, accessibility has been defined in different ways (Swanson, 1982). Culnan (1984, 1985) defined it as a multi-dimensional construct comprising three aspects: the physical access, the interface access and the informational access. Physical access refers to a user physical ability to gain access to an information system. Interface access refers to the ability to translate queries for information into the language of the information system. Finally, informational access refers to the ability to retrieve information. Karahanna and Straub (1999) defined accessibility in terms of physical accessibility. Similarly, Lin and Lu (2000) and Cheung (2002) confined it to the availability and speed of the computer and the internet. The term accessibility also has another meaning within the World Wide Web context. In this setting, accessibility refers to how web-page designers and developers make web content more accessible to people with special needs (Paciello, 2000).

Definition of accessibility in this research is consistent with, but not restricted to, that of Karahanna and Straub (1999), Lin and Lu (2000) and Cheung (2002). It refers to availability of internet access points and connection speed and cost. More importantly, the research looks at accessibility from the student's perspective, i.e. the subjective perceptions of e-learning accessibility; hence, the concept is termed PA of e-learning.

The issue of accessibility has attracted considerable research (Rice & Shook, 1988; Hiltz, 1983; Svenning & Ruchinskas, 1984; Al-Khaldi & Al-Jabri, 1998; Carey, Chisholm, & Irwin, 2002; Lin & Lu, 2000). Chanchary and Haque (2007) conducted a study on first-year university students of Bangladesh to identify crucial domains for e-learning success. Their study analysed student logs of a Learning Management System over a four-month duration in conjunction with data gathered from a questionnaire survey addressing students' academic and personal information. Their results showed that students who had inadequate access to computers and internet technology obtained poor grades. The failure of those students was mainly due to lack of access more than any other reason, the researchers argued.

Within the Saudi context, Al-Khaldi and Al-Jabri (1998) investigated the attitudes of 300 undergraduate students from different business majors in a Saudi university toward computers. Among the factors studied was the degree of access to computers. Computer accessibility was found a significant determinant of the students computer use. In the same way, Allehaibi (2001) found that limited and slow access to the internet has impeded its diffusion among faculty members in Saudi universities.

The issue of access is especially important if the targeted users belong to low-income groups (Bates, 2005). Chia and her associates (2006) looked at a group of internet non-users to identify the factors that affected their intention to adopt the internet in Singapore. The study found that lack of access to a computer and internet connection was a major impediment to go online for non-adopters. The researchers argued that it is

important to ensure that the individuals have adequate access to e-learning before implementing such systems (Chia et al., 2006). Likewise, Carey et al. (2002) investigated and compared computer access, attitudes and perceptions towards computers, and preferred settings for computer learning among college freshmen in Australia, China, Ghana, Puerto Rico and the US. They found that increased access to computers is related to positive attitudes towards computers. This was also reported by Lin and Lu (2000) who found system accessibility a significant antecedent of website ease of use and attitudes.

Access to e-learning not only refers to the availability of connection points and the availability of the right equipment, but also implies the costs associated with these matters. From the e-learning providers' angle, the development and provision of e-learning courses require relatively large budgets (Yieke, 2005). This is also true for the learners who have to consider the costs of hardware, software, internet connection and maintaining malfunctions expenditure (Owston, 1997), printing and the hidden costs of down-time in the network (Kehrwald, 2005). Therefore, the issue of cost is critical for users in the decision to adopt a new technology (Mathieson et al., 2001). This might be even more critical in the Saudi context, where the costs of internet connection are still high (Teitelbaum, 2002; Aleid, Rogerson & Fairweather, 2009) compared to other countries such as the US, UK and Malaysia. The high costs associated with using e-learning can be an obstacle to its acceptance (Daugherty & Funke, 1998). A study by Dwivedi and Weerakkody (2007) confirmed that broadband costs are one of the reasons for the slow adoption of broadband among consumers in Saudi Arabia. This has been also found in other contexts. In Taiwan, Luarn and Lin (2005) and Wang, Lin and Luarn (2006) found that perceived financial cost had a significant influence on BI to use mobile services.

Moreover, if e-learning costs more than the traditional education, as Du (2004) argues, this may limit the type of students who are able to afford this form of learning. This can be a potential drawback for e-learning because the technological equipment and financial requirements related to e-learning are not accessible to everyone, (Dhanarajan, 2001; Kruse, 2001; O'Donoghue, Singh, & Green, 2004). The fact that higher education is free in the Saudi context renders enrolling on an e-learning course (that is associated with extra costs) a matter to be financially considered compared to the free traditional courses.

Theoretically, PBC is a function of control beliefs (Ajzen, 1985). In the present research, perceived e-learning accessibility (PA), defined in terms of e-learning availability (i.e. hardware, software and internet connection) and affordability (i.e. costs, having access at home) is viewed as underlying PBC. The higher the perception of the accessibility and availability of resources of a system, the higher will be its acceptance (Chang & Kannan, 2006). Thus, the following hypothesis will be assessed:

H7b: PA will influence the students' PBC over adopting e-learning.

3.5.7.3 University Support

Several studies have shown that institutional support is an important factor influencing IT system acceptance and usage (Igbaria, Parasuraman & Baroudi, 1996; Wagner & Flannery, 2004; Cheung & Huang, 2005; Ngai et al., 2007; Selim, 2007; Lim et al., 2008). Support from the institution is critical because it ensures that the essential resources are allocated for e-learning (Cheung & Huang, 2005). Institutional support was found to correlate with users' satisfaction with a computing system (Igbaria & Nachman, 1990). In their research to explore issues relating to the use of the internet in university education, Cheung and Huang (2005) indicated that providing support by the institution might lead to greater use and more effective learning. In contrast, lack of support could lead to rejection of e-learning (Nanayakkara & Whiddett, 2005).

University Support can take the form of support from technical experts, provision of adequate computer and internet facilities as well as training (Cheung & Huang, 2005). Technical support including help with hardware, software or internet connection problems was found to be an important factor in the acceptance of technology for education (Selim, 2007; Ngai et al., 2007). Training to use the internet and the e-learning system is considered an essential part of institutional support. Nanayakkara and Whiddett (2005) found that failure to provide adequate training might result in a high level of user apprehension in accepting e-learning. University administration support to e-learning is also essential for its success (Selim, 2007). In a meta-analysis of 57 studies to investigate the factors that affect IT usage, Mahmood, Hall, and Swanberg (2001) found organisational support among the factors with the highest effect sizes, i.e. significant impact. They argue that organisational support had a strong influence on individual propensity toward the use of IT systems. Passmore (2000) indicated that students' satisfactions and progress in e-learning depended on institutions providing adequate facilities and infrastructures of technology and support.

In the present study, University Support (US) is viewed as one control belief underlying PBC (Ndubisi, 2004). In total, control beliefs lead to the perception that one has or does not have the ability to perform the behaviour, i.e. PBC. US is hypothesised in this study as a control factor that determines PBC over adopting e-learning:

H7c: US will influence the students' PBC over adopting e-learning.

3.5.8 MEDIATING ROLE OF DIRECT CONSTRUCTS

Ajzen (1988) argues that the so-called 'external' influences on behaviour should be mediated through the theory of Planned Behaviour variables: that is attitude, SN and PBC. Accordingly, these global constructs (AT, SN and PBC) mediate the effects of their belief-based determinants on intention (Ajzen, 1988; Ajzen & Fishbein, 1980). Generally, for a variable or group of variables to function as mediators, a relationship should exist between the independent variable (belief constructs) and the mediating variable (global constructs), as well as between the mediating variable and the dependent variable (Baron & Kenny, 1986). However, while most research has been

concerned with the relationship between the global constructs and BI, the relationship between belief-based variables, mediators (A, SN and PBC) and BI has only been a topic in a very limited number of studies (Godin, Gagné, & Sheeran, 2004).

For example, the findings of Courneya, Friedenreich, Arthur, and Bobick (1999) show that TPB only partially mediated the influence of personality measures on exercise behaviour. In addition, Conner and Abraham (2001) found that the theory mediated the relationship between conscientiousness and intention. Armitage, Norman and Conner (2002) reported that the model mediated the link between demographics and behaviour. Ndubisi (2004) found that the theory constructs mediated the influence of several external factors on intention. This study also aims to study the possible mediating role of the global constructs of TPB on the links between several external factors and intentions.

Since attitude is further decomposed into its salient beliefs, its role as a mediator between these beliefs and BI will be further investigated. There is empirical research supporting this proposition (Davis et al., 1989; Ndubisi, 2004; Mahmod et al., 2005). Thus, the following hypotheses will be tested:

H5e: Attitude toward adopting e-learning will mediate the relationships between the attitudinal beliefs and BI to adopt e-learning as a supplementary tool.

H5f: Attitude toward adopting e-learning will mediate the relationships between the attitudinal beliefs and BI to adopt e-learning for distance education.

Ndubisi (2004) in his study on the adoption of Blackboard in a Malaysian university found SN to mediate the relationship between course leaders' influence and intention. Based on Ndubisi's research, this study also hypothesises that:

H6d: SN regarding adopting e-learning will mediate the relationships between the normative beliefs and BI to adopt e-learning as a supplementary tool.

H6e: SN regarding adopting e-learning will mediate the relationships between the normative beliefs and BI to adopt e-learning for distance education.

Furthermore, in a study by Ndubisi (2004) PBC was found to mediate the relationship between control beliefs and intention. This implies that the effect of the control beliefs is carried by PBC. Accordingly, these hypotheses will be also tested:

H7d: PBC over adopting e-learning will mediate the relationships between the control beliefs and BI to adopt e-learning as a supplementary tool.

H7e: PBC over adopting e-learning will mediate the relationships between the control beliefs and BI to adopt e-learning for distance education.

3.6 THE RESEARCH MODEL

Following the discussion of the constructs of interest in this research, this section presents and discusses the research conceptual model. The current research envisages a model for understanding students BI to adopt e-learning. The research model is shown

in figure 3-1. The basic framework of the model is the theory of Planned Behaviour (Ajzen, 2005). This theory is a comprehensive model covering three dimensions while explaining any behaviour. It is a modified version of the theory of Reasoned Action (Fishbein & Ajzen, 1975) that takes into account control factors as well as individual and social factors for explaining human behaviours. Nevertheless, although Ajzen's model incorporates these angles, it overlooks the institutional dimension. As such, the current model integrates a construct tapping the institutional factor. Moreover, the research model draws on TAM (Davis, 1989), in that it incorporates the model's two attitudinal beliefs: PU and PEOU. Although TAM is a very powerful model for explaining technology acceptance, it lacks addressing social or control factors. Thus, TPB was chosen as the skeleton of our model instead. Similarly, the DOI (Rogers, 1962) model tackles only system characteristics which makes it inadequate to explain the complexity of users' adoption of e-learning.

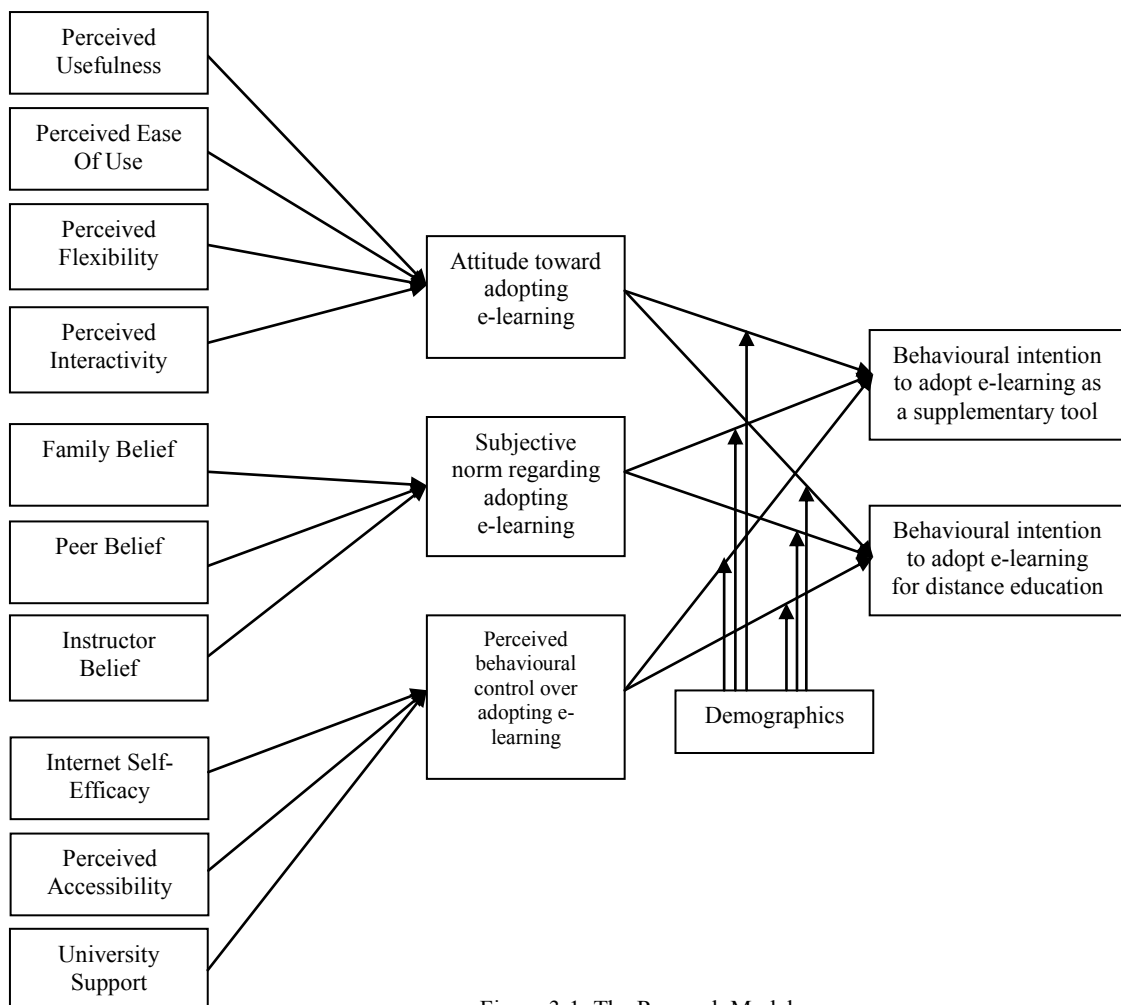


Figure 3-1: The Research Model

Nevertheless, its most significant constructs, i.e. relative advantage (or PU) and complexity (or PEOU) were incorporated in the model. In such a way, the study has sought to build a model to explain and predict Saudi students' intention to adopt e-

learning based on sound theoretical models by incorporating different and distinctive constructs from the mentioned theories so as to mitigate any limitations inherent in anyone of them.

The model has two dependent variables: the first dependent variable is BI to adopt e-learning as a supplementary tool (BIS), that is the students adopt e-learning tools and capabilities to supplement their studies. This may take different forms and levels. For example, at the basic level, e-learning collaboration tools such as the e-mail can be effectively used to receive announcements, communicate with tutors and students, and submit assignments and get feedback. In a more advanced 'blended' learning level, the course curriculum can be available on-line and the students can access all relevant information via an LMS such as Blackboard. E-learning can enrich and support lectures, seminar meetings and face-to-face tutorials (Collis & Moonen 2001). The second dependent variable is BI to adopt e-learning for distance education (BID). E-learning represents an advanced method for delivering distance education. A distance education course can be offered by an LMS such as Moodle or Blackboard, in which the student downloads materials, communicates with other students and receives support from a tutor or advisor regarding any problem.

According to TRA and TPB, human behaviour is guided by three types of considerations: beliefs about the likely consequences or other attributes of the behaviour (behavioural or attitudinal beliefs), beliefs about the normative expectations of other people (normative beliefs) (Fishbein & Ajzen, 1975), and beliefs about the presence of factors that may facilitate or hinder performance of the behaviour (control beliefs) (Ajzen, 1985). In their respective aggregates, behavioural beliefs produce a favourable or unfavourable attitude toward the behaviour; normative beliefs result in perceived social pressure or SN; and control beliefs give rise to PBC, the perceived ease or difficulty of performing the behaviour. In combination, attitude toward the behaviour, SN, and PBC lead to the formation of a behavioural intention. Since intention is assumed to be the immediate antecedent of behaviour, people are expected to carry out their intentions when the opportunity arises. The model postulates that the students' BI to adopt e-learning as a supplementary tool and for distance education are determined by three factors: attitude, SN and PBC. The first construct, attitude refers to a student's positive or negative feeling (evaluative affect) about the adoption of e-learning. SN represents the social influences on the adoption of e-learning and refers to the perception about whether others who are important to the student believe that he or she should adopt e-learning. PBC represents the constraints on the adoption of e-learning and refers to the perceived ease or difficulty of adopting e-learning. Moreover, two demographics: gender and internet experience are hypothesised to exert some influence on the relationships between intention and its determinants. Furthermore, attitude toward the adoption of e-learning is determined by attitudinal beliefs. Based on TAM (Davis, 1989) and PCI (Rogers, 2003), e-learning PU and PEOU are the antecedents of attitude. In addition, e-learning perceived flexibility and interactivity are also hypothesised to influence attitude toward the adoption of e-learning. Moreover, SN is hypothesised to be determined by beliefs of three important groups: family, peers and

instructors. Finally, PBC is also hypothesised to be determined by three control beliefs: ISE, PA and US.

3.7 DIFFERENCES BETWEEN STUDENTS IN BI

As mentioned above when discussing individual users differences as factors influencing adoption of e-learning, key demographic variables such as experience, gender, mode of study and place of residence can offer significant information regarding the characteristics of the population under study. Studying the demographics of users or potential users as Dwivedi (2008) asserts, may assist policy makers by identifying the various segments' specific needs. Based on a review of the relevant literature, eight demographic variables are identified as important in the context of the research and the adoption of e-learning. The eight variables are gender, place of residence, mode of study, faculty, job responsibilities, family responsibilities, type of internet connection and internet experience.

3.7.1 GENDER

Understanding gender differences in individual technology adoption and usage decisions has been identified as a significant issue in the technology acceptance literature (Venkatesh, Morris, & Ackerman, 2000). Several studies found that there are differences between males and females in their technology-related variables including adoption (Venkatesh & Morris, 2000; Venkatesh et al., 2000). Generally, the literature reports that males have more favourable attitudes towards technologies than females. Females generally experience greater computer anxiety and negative perceptions than males (Keller et al., 2007). However, other studies found no significant difference between men and women regarding perceptions and usage of IT (Leong et al., 2002). In this study, the following hypotheses are posited:

H8.1a: There is no difference in BI to adopt e-learning as a supplementary tool between male and female students.

H8.1b: There is no difference in BI to adopt e-learning for distance education between male and female students.

3.7.2 MODE OF STUDY

Mode of study refers to the patterns and intensity of studying (Schuetze & Slowey, 2002). Full-time, part-time and distance learning are three choices of studying in many countries, including the UK and Saudi Arabia. A full-time study mode requires the student to attend for a standard number of hours. In such a case, the student carries a full academic load, whereas a part-time student usually takes a lighter load and completes the programme of study over a longer period of time. In the distance learning mode, the students are sent a syllabus and materials (e.g. a recording of the actual lecture that was delivered at the university campus, notes and handouts). In this mode,

studying mainly takes place at the home or office without the need to attend lectures, apart from one or two introductory or revision sessions. Examinations also take place on-campus. Within the context of this study, King Abdul Aziz University, there are two modes of study: the regular mode that bears a resemblance to the full-time status described above, and the ‘intisab’² that is a hybrid between the full-time and distance learning modes of study. In this latter mode, the student is required to take a full load, yet she or he does not need to attend on a regular basis. However, the student needs only be present for the final examinations (Al-Ghonaim, 2005).

Since some students are employed or have domestic and other responsibilities, they are often not capable of enrolling in the traditional full-time method that is characterised by regular attendance and fixed full schedules. The existence of modes of study that accommodate the special needs of those students is thus important (Schuetze & Slowey, 2002). The new advancements in information and communication technologies are facilitating and popularising such modes of study (Gatrell, 2006). E-learning attracts part-time and distance-learning students due to its flexibility and interactivity. Students “can follow the course without wasting precious time travelling to and from campus several evenings a week, and participation can take place also in situations where it would otherwise be impossible (e.g. a sick child or a business trip)” (Bennedsen & Caspersen, 2003, p. 1).

There is little literature on the use of ICT and mode of study. In one study to explore and evaluate the use of synchronous e-learning technologies in lectures for part-time mature evening students, Jennings (2005) reported that part-time students found synchronous e-learning technologies very useful. In another study, Dorman (2005) found that the students’ status of study (full-time vs. part-time) shaped the learners’ attitudes and preferences towards participation in internet-based instruction. Moreover, the researcher found significant difference between full-time and part-time students in their attitudes and preferences related to web-based learning.

Similarly, Wagner, Werner and Schramm (2005) investigated the impact of six variables including mode of study on students’ perceptions of on-line learning. They found that mode of study influenced attitudes and preferences about online study. Additionally, the study revealed that part-time students generally perceived on-line courses more positively than full-time students did. Moreover, part-time students were significantly more positive about the on-line approach as an effective delivery method, and were more likely to recommend such courses to others. To ascertain if the full-time and part-time students differ in respect to their BI to adopt e-learning, the following hypotheses will be tested:

² *Intisab* is an Arabic word that literary means *affiliation*. It is used in Saudi Arabia to denote external study (Al-Rawaf & Simmons, 1992) and the student who studies via this mode is called *muntasib* or *affiliated*.

H8.2a: There is no difference in BI to adopt e-learning as a supplementary tool between the full-time and part-time students.

H8.2b: There is no difference in BI to adopt e-learning for distance education between the full-time and part-time students.

3.7.3 PLACE OF RESIDENCE

As described in the introduction, Saudi Arabia is a huge country occupying an area of 868,730 m². The major cities are concentrated in a few areas along the middle. As shown in figure 3-2, these areas include the cities that have populations of over 500,000. The government provides primary and secondary education to all areas, even the most remote, such as the small towns of the Empty Quarter desert. However, tertiary education institutions are mainly located within the big cities. Therefore, students from rural and remote regions who wish to continue their studies have to move to one of the main cities to have a chance of tertiary education. If the student comes from one of the Middle, Midwest or Mideast areas, there will be no major travel, however, if the student comes from a region, which is far from the main urban areas, daily commuting will be a great hassle and even sometimes impossible with an absence of a reliable public transportation system (Al-Harbi, 2002). For female students, who for cultural reasons are not allowed to drive, the situation is even more difficult (Al-Arfaj, 2001).

E-learning offers the potential to overcome many unique challenges that characterise the remote and rural regions (Mason & Rennie, 2004). Its flexible and



Figure 3-2: Saudi Arabia

interactive capabilities can offer an alternative means for delivering education for rural students who are hampered by geographical barriers (Hobbs, Moshinskie, Roden, & Jarvis, 1998; Zhang et al., 2006). E-learning allows the students to reduce travel-related expenses (Ozdemir & Abrevaya, 2007). Al-Arfaj (2001) contends that in a large country like Saudi where universities are concentrated only on a few urban areas, e-learning will bring education to those students from the remote rural areas.

There has been comparatively little work examining the relationship between geographic variation and internet usage (Forman, Goldfarb, & Greenstein, 2005).

Forman et al. (2005) analysed a cross-section of potential adopters of internet technology focusing on the contribution of location to the probability of adopting different internet applications. They found that participation in the internet is more likely in rural than in urban areas. In a similar vein, Ozdemir and Abrevaya (2007) investigated the factors that facilitated the fast adoption and use of technology-mediated distance education among higher education institutions. Their study revealed that being in an urban location negatively affected enrolment in the courses at the undergraduate but not at the graduate level.

In a study to explore the influence of six socio-demographic variables on the level of participation in an online conference, McLean and Morrison (2000) found a strong significant difference between urban and rural students in their level of participation in the online conference. Contrary to the previously mentioned studies, learners living in cities participated more than learners who live outside of them. Moreover, the influence of residence on participation when holding the other key independent variable constant, was significantly strong and predicted 32.3% of participation along with education. Likewise, Rennie (2003) reported that the students frequently quote the benefits of e-learning in reducing the difficulties of physical communication across rural areas. The feeling of connectedness to people and resources created by e-learning capabilities can compensate for the disadvantages of living geographically remote from centralised (urban) areas and their facilities (Anderson, 2000).

In this study, the following hypotheses are postulated to find out if differences exist between the urban and rural students in their BI:

H8.3a: There is no difference in BI to adopt e-learning as a supplementary tool between the urban and rural students.

H8.3b: There is no difference in BI to adopt e-learning for distance education between the urban and rural students.

3.7.4 FACULTY

There is some question as to the appropriateness of some subjects for e-learning. Certain subjects (such as religion) do not lend themselves to self-learning and are better taught in the conventional classroom setting (Sa'ad, 2005). Similarly, subjects that are complex and involve practical application (e.g. medicine) may not be suitable via e-learning (Thompson, 2001). Some studies have examined the relationship between academic specialisation or major and perceptions and usage of e-learning (Al-Arfaj, 2001; Liaw, 2002a; Yang, 2005; Hsbollah & Idris, 2009; Berteau, 2009). Hsbollah and Idris (2009) investigated lecturers' decisions to adopt e-learning using Rogers' PCI. Their study found academic specialisation to be a key determinant of adoption decisions. However, Al-Arfaj (2001) who investigated the differences between university students in their perceptions towards distance web-based education, found no significant differences between the students of the different colleges. Nevertheless, when experience was controlled, a small but significant difference emerged between the

students based on their college in favour of management students. Similarly, Liaw (2002a) reported no significant difference in attitude regarding computers and the internet between students who majored in science and engineering and those who majored in social and behavioural sciences. Berteau (2009) has also reported no difference between the students in their attitude towards e-learning based on their academic specialty. This research seeks to ascertain if the students differ in their intention based on their faculty. Accordingly, these hypotheses are postulated:

H8.6a: There is no difference in BI to adopt e-learning as a supplementary tool between the students of the different faculties.

H8.6b: There is no difference in BI to adopt e-learning for distance education between the students of the different faculties.

3.7.5 JOB AND FAMILY RESPONSIBILITIES

E-learning can expand access to higher education to meet the educational needs of the under-served populations (Al-Arfaj, 2001). For many individuals in the past, academic calendars have not matched job and family obligations and the courses available may not have met their needs. E-learning is said to facilitate traditional education, meeting the needs of working students and those who have domestic commitments (Thompson, 2001). Al-Harbi (2002) contends that in the Saudi society where young women get married early, web-based education can offer educational opportunities for those women with domestic commitments. Moreover, e-learning can be a solution for working students, allowing them to adapt their learning schedule to their job program. Berteau (2009) examined if there was any difference between students in their attitudes towards e-learning based on their occupational status. She found a significant difference in attitude of students in employment compared with those who were not. She argues that virtual environments are more accepted by working students, because they are constrained by a limited schedule. This research will test the following hypotheses:

H8.4a: There is no difference in BI to adopt e-learning as a supplementary tool between the students with a job or without.

H8.4b: There is no difference in BI to adopt e-learning for distance education between the students with a job or without.

H8.5a: There is no difference in BI to adopt e-learning as a supplementary tool between the students with family responsibilities or without.

H8.5b: There is no difference in BI to adopt e-learning for distance education between the students with family responsibilities or without.

3.7.6 TYPE OF INTERNET CONNECTION

Using e-learning to aid studying requires high-speed internet connection. This is even more important in the context of distance education, where greater dependence on

the connection is assumed. Thus, the faster the internet connection (that allows greater download and live streaming speed), the greater the PEOU of e-learning tools and applications (Amoroso & Guo, 2006). The type of internet connection has been shown empirically to affect user propensity to adopt technology (Amoroso & Guo, 2006). Davison and Cotton (2003) reported that those with broadband connections are significantly more likely to spend longer on the internet than those with the dial-up connection. In this study, the following hypotheses are posited and tested:

H8.7a: There is no difference in BI to adopt e-learning as a supplementary tool between the students with the different types of internet connection.

H8.7b: There is no difference in BI to adopt e-learning for distance education between the students with the different types of internet connection.

3.7.7 INTERNET EXPERIENCE

Previous studies have shown that experience is a key variable in technology adoption (Sun & Zhang, 2006; Liao & Lu, 2008). Taylor and Todd (1995b) investigated the factors that may influence users' intentions to use a computer facility. They found significant differences in the relative influence of the determinants of usage depending on experience. Oh, Ahn and Kim (2003) in their study of broadband adoption in Korea found that experience with the technology influenced PU and PEOU. Prior experiences help an individual turn to new technology with ease (Oh et al., 2003). Moreover, experience influenced the formation of positive attitudes towards the technology by making people feel comfortable and ready to adopt it. When an individual has previous experience with the technology, he or she is in a better position to adopt it, if he or she found it useful. Likewise, in the context of e-learning adoption, Pituch and Lee (2006) found that computer experience influenced BI to adopt e-learning. As e-learning is internet-based, experience with the internet provides the individual with some knowledge on the benefits of e-learning and on how to use e-learning with less effort and time. The following hypotheses are proposed to uncover any difference in the sample between the students with the different IE:

H8.8a: There is no difference in BI to adopt e-learning as a supplementary tool between the students with the different levels of IE.

H8.8b: There is no difference in BI to adopt e-learning for distance learning between the students with the different levels of IE.

3.8 SUMMARY

This chapter reviewed the literature on the adoption of e-learning. The review revealed the importance of various factors, which generally can be grouped into four dimensions: individual user, social, system and institution. However, the review showed that none of the reviewed studies has attempted to combine the four dimensions in one research. Further, it was found that no study on the adoption of e-learning from the

Saudi students' perspective has been conducted. The chapter also looked in depth at the constructs comprising the research conceptual model. The chapter defined and reviewed the literature on each construct. It also put forward the hypotheses related to each construct of the model. The chapter also described the research conceptual model. The next chapter will describe in detail the methodology adopted in this research.

4 CHAPTER FOUR

METHODOLOGY

4.1 INTRODUCTION

Having outlined the research problem and reviewed the relevant literature, this chapter presents the methods adopted to answer the research questions and test its hypotheses. This chapter starts by giving an overview of the research methods available for social sciences. Then it describes the research design adopted for this study. Next, it discusses in detail the phases of the research design describing sampling, procedures and limitations of the techniques used in each phase. Finally, the chapter closes with a summary.

4.2 PHILOSOPHICAL UNDERPINNING OF RESEARCH PARADIGMS

In his influential book, *The structure of scientific revolutions*, Kuhn (1962) defined paradigms as “universally recognised scientific achievements that for a time provide model problems and solutions to a community of practitioners” (Kuhn, 1962, p. viii). In other words, a paradigm is a set of beliefs about the world that is shared by a community of scientists researching that world. These assumptions offer conceptual and philosophical frameworks or ‘world views’ regarding the world and the nature of research that guide research action (Deshpande, 1983; Guba, 1990; Creswell, 2009).

According to Collis and Hussey (2003) and Bryman (2008), there are two main research paradigms or philosophies: positivist and interpretivist. These paradigms may be sometimes referred to by different terms such as quantitative and qualitative, scientific and humanistic (Collis & Hussey, 2003). There is, however, considerable blurring between the two paradigms and several authors suggest regarding them as the two extremes of a continuum (Newman & Benz, 1998). In Creswell’s (2009) words, “a study tends to be more qualitative than quantitative or vice versa” (p.3).

These philosophical assumptions, or epistemology and ontology as termed by Crotty (1998), may not be explicit to the researcher; nevertheless, they have impact on the practice of the research (Creswell, 2009). That is, the nature of these beliefs will influence the choice of adopting a qualitative or quantitative approach.

Creswell (2004) described lucidly the difference between the two paradigms in terms of the ontological and epistemological assumptions. Ontology refers to the assumptions about the nature of social reality while epistemology refers to the claims made about the ways in which it is possible to gain knowledge of reality (Blaikie, 1993). Positivists view reality as objective, singular and detached from the researcher (Creswell, 1994). This paradigm is based upon “the rationalistic, empiricist philosophy that originated with Aristotle, Francis Bacon, John Locke, August Comte and

Emmanuel Kant” (Mertens, 2005, p. 8) and holds “a deterministic philosophy in which causes probably determine effects or outcomes” (Creswell, 2009, p. 7). Additionally, positivism is based on the position of naturalism, that is the existence of a natural scientific study of individuals and society (Blaikie, 1993). According to this view, although differences exist in subject matter of the natural and social sciences, the same method or logic of explanation can be used (Popper, 1961). Popper (1961) reflects this view:

I do not intend to assert that there are no differences whatever between the methods of the theoretical sciences of nature and of society; such differences clearly exist, even between the various natural sciences themselves, as well as between the various social sciences...but I agree with Comte and Mill – and many others...that the methods in the two fields are fundamentally the same (pp. 130-1).

Positivism also holds the concept of reductionism, that is objects can be reduced into smaller objects, for instance, research hypotheses and questions can be reduced into variables and constructs (Hacking, 1981; Creswell, 2009). Moreover, positivists hold the view that knowledge is conjectural and thus absolute truth can never be found (Phillips & Burbules, 2000). For positivists, only the phenomena that can be observed and measured are considered valid knowledge (Collis & Hussey, 2003). Thus, knowledge is objectively measurable through numeric measures. In the positivists’ view, the world is governed by laws or theories that need to be verified “through observation and measurement in order to predict and control forces that surround us” (O’Leary, 2004, p. 5). Finally, the positivist researchers start their inquiry by a hypothesis, followed by collection of data, which either confirms or rejects the hypothesis (Phillips & Burbules, 2000). Quantitative research is often associated with this view.

On the other hand, the other paradigm, interpretivism, holds the view that reality is subjective and multiple (Creswell, 1994). Interpretivism, sometimes referred to as social constructivism (Berger & Luckmann, 1984) or phenomenological (Collis & Hussey, 2003), is represented by the works of Berger and Luckmann (1984) and Lincoln and Guba (1985). Interpretivism is based on the assumptions that “reality is socially constructed” (Mertens, 2005, p. 12), specifically, “individuals seek understanding of the world in which they live and work. Individuals develop subjective meanings of their experiences” (Creswell, 2009, p. 8). Thus, diverse and manifold meanings are constructed as the researcher interacts with the world. The researcher tends to look for the complexity of the situation instead of narrowing it into a few ideas (Creswell, 2009). Interpretivists usually focus on participants’ interaction and contexts. The research methods used under this paradigm are “an array of interpretive techniques which seek to describe, translate and otherwise come to terms with the meaning, not the frequency of certain more or less naturally occurring phenomena in the social world” (Van Maanen, 1983, p. 9). Therefore, interpretivist researchers inductively generate patterns of meanings or theories from the data collected in the participants’ context.

4.2.1 QUANTITATIVE AND QUALITATIVE RESEARCH APPROACHES

According to Collis and Hussey (2003), the researcher's basic beliefs about the world will be reflected in the way he or she designs research, how they collect and analyse the data as well as the way they write their report or thesis. As such, in planning a research, Creswell (2009) argues that researchers need to understand the philosophical assumptions that they bring to the research, the strategy of inquiry that is associated with these assumptions and the particular methods of research that turn the approach into practice. Having outlined the positivistic and interpretivist epistemological paradigms, this section illustrates the research methodologies that are associated with each.

Quantitative and qualitative research methods are two broad approaches to research, often used in social science studies, including education and Information Systems Management (Palys, 1997). Quantitative research can be defined as "a research strategy that emphasises quantification in the collection and analysis of data" (Bryman, 2008, p. 22). This methodology can be traced back to the late 19th century when social scientists adopted methods in the natural sciences such as physics and biology (Creswell, 2005). For instance, Durkheim stated that social facts should be treated as things, in other words, the objects of study in the social sciences should be treated in the same way as physical scientists treat physical things (Smith, 1983).

Within this approach, conceptual constructs or variables are measured by means of instruments and the emerged numerical data is analysed by applying statistical tests. The quantitative methodology entails a deductive approach to the relationship between theory and research (Bryman, 2008). That is, hypotheses are deduced from theories and subjected to empirical scrutiny. Researchers who adopt this methodology have assumptions about testing theories deductively, guarding against bias, controlling for other explanations and being able to generalise and replicate the research outcomes (Creswell, 2009).

Qualitative methodology is "a means for exploring and understanding the meaning individuals or groups ascribe to a social or human problem" (Creswell, 2009, p. 4). The ideas for qualitative research appeared in the late 1800s and early 1900s in the anthropological studies of the indigenous cultures (Creswell, 2005). However, the term qualitative research was not used until the late 1960s (Bogdan & Biklen, 1992). In a qualitative approach, the aim is not to generalise to a population but to develop an in-depth exploration of a phenomenon (Creswell, 2005). The natural setting is the direct source of data and the researcher is the key instrument (Bogdan & Biklen, 1992). With a qualitative approach, there may be no existing theory to start with; rather, the researcher constructs a theory describing patterns which emerge from the data (Collis & Hussey, 2003).

As such, qualitative researchers analyse their data inductively. They are not looking for evidence to support or refute hypotheses; instead, “the abstractions are built as the particulars that have been gathered are grouped together” (Bogdan & Biklen, 1992, p. 31). Moreover, meaning is of central concern to the qualitative researchers. In other words, they are interested in the ways different individuals make sense of their lives (Bogdan & Biklen, 1992; Creswell, 2009).

4.2.2 MIXED METHODS RESEARCH

In their answer to the question: Can qualitative and quantitative approaches be used together? Bogdan and Biklen (1992) argue that the practice of combining both methods is not uncommon and thus it is possible and sometimes even desirable. As Creswell (2005) notes, this research approach has gained increasing popularity. Some authors such as Johnson, Onwuegbuzie and Turner (2007) even argue that mixing the two research approaches or mixed methods research can be regarded as the third major research approach. In the research methods continuum proposed by Newman and Benz (1998), which has quantitative and qualitative research approaches as its two different ends, mixed methods research covers the large set of points in the middle area (Johnson & Onwuegbuzie, 2004).

However, some writers argue that mixed methods research is not possible. Their argument is based on the ground that each of the two research approaches “sponsors different procedures and has different epistemological implications” (Smith, 1983, p. 12). Smith and Heshusius (1986) in advocating the use of mono-methods, criticise the combining of qualitative and quantitative research strategies because it ignores basic differences in the philosophical assumptions of the two perspectives and leads to the conclusion that “the two approaches are variations in techniques within the same assumptive framework, to reach the same goals and solve the same problems” (p. 6). Thus, “the claim of compatibility, let alone one of synthesis, cannot be sustained” (Smith & Heshusius, 1986, p. 4).

On the other hand, other writers see such a combination is not only encouraged, but often required (Howe, 1988). For example, Howe (1988) argues that, “combining quantitative and qualitative methods is a good thing” and rejects that “such a wedding of methods is epistemologically incoherent” (p. 10). The advocates of this approach deny the incompatibility thesis (Smith, 1983) which implies that “positivist and interpretivist paradigms underlie quantitative and qualitative methods, respectively; the two kinds of paradigms are incompatible; therefore, the two kinds of methods are incompatible” (Howe, 1988, p. 10). This, as Onwuegbuzie and Leech (2005) assert, is far from being the case, because “the epistemology does not dictate which specific data collection and data analytical methods should be used by researchers” (p. 367). In addition, other scholars have argued that a false dichotomy exists between quantitative and qualitative approaches (Newman & Benz, 1998; Onwuegbuzie & Leech, 2005). These thinkers contend that quantitative techniques are not necessarily positivist, nor are qualitative methods necessarily hermeneutic (Onwuegbuzie & Leech, 2005). Hence,

they advocate combining methods within a single research (Creswell & Plano Clark, 2007). Furthermore, Creswell and Plano Clark (2007) state that because both approaches have inherent strengths and weaknesses, researchers should use the strengths of both approaches in order to understand better social phenomena. Mixed methods research, thus, rejects traditional dualism, which views qualitative research and quantitative methods as characterising distinct, mutually exclusive worldviews (Xie, 2005).

4.3 STUDY DESIGN: MIXED METHODS RESEARCH

This research adopts a mixed methods approach (Creswell & Plano Clark, 2007). This section describes mixed methods research and justifies its selection. Mixed methods research can be defined as “the class of research where the researcher mixes or combines quantitative and qualitative research techniques, methods, approaches, concepts or language into a single study” (Johnson & Onwuegbuzie, 2004, p. 17). The objective of mixed methods research is not to substitute either of the qualitative or quantitative approaches. Instead, mixed methods research can produce distinctive findings by drawing from the strengths of both approaches while decreasing their weaknesses (Johnson & Onwuegbuzie, 2004). As Bryman (2007) notes, “bringing quantitative and qualitative findings together has the potential to offer insights that could not otherwise be gleaned” (p.9). However, this can be only achieved with meticulous designs and methodical implementation (O’Cathain, Murphy, & Nicholl, 2007).

Mixed methods research has a relatively recent history in the social and behavioural sciences. It can be traced back to the first 60 years of the 20th century (Tashakkori & Teddlie, 2003). Mixed methods research emerged with the belief that both qualitative and quantitative methods can be useful in addressing research problems and questions. As such, this approach is not totally new; rather, it can be viewed as a “new movement, or discourse, or research paradigm (with a growing number of members) that has arisen in response to the currents of quantitative research and qualitative research” (Johnson et al., 2007, p. 113).

This research uses a mixed method approach to understand the factors that influence e-learning adoption. The mixed methods design includes the collection and analysis of both quantitative and qualitative data. More specifically, following the classification of mixed method designs by Creswell, Plano Clark, Gutmann and Hanson (2003), this study adopts a sequential explanatory design. While Creswell et al.’s definition has only two phases; this study adopted a three-phase design. In brief, the study starts with a qualitative small-scale study for the purpose of identifying variables and developing the research instrument. A main quantitative phase follows to validate the instrument and answer the research questions. Next, a subsequent qualitative phase follows from and connects to the results of the main quantitative phase. However, the greater emphasis is placed on the quantitative phase, as the main aim of this research is

to evaluate the proposed model of e-learning adoption. Any unexpected results from the main quantitative study are explored in greater depth by incorporating qualitative data from follow-up semi-structured interviews. The strengths of such design are:

It is easy to conduct as it involves separate stages in which one method is used at a time;

It is not too complicated in documenting as the report can be written in different phases (Creswell & Plano Clark, 2007).

The rationale for using this design, that is, incorporating qualitative methods into the mainly quantitative study, is two-fold. Firstly, as the phenomenon under study (adoption of e-learning) is recent with little research on it, an initial qualitative phase (focus-group) was used to identify constructs (factors influencing e-learning adoption) and to aid in the development of the research instrument. Secondly, if any unexpected results emerge from the quantitative phase, by integrating qualitative data a deeper understanding can be obtained. Polit and Hungler (1999) illustrate this approach:

Quantitative methods often demonstrate that variables are systemically related to one another, but they often fail to provide insights about *why* the variables are related... . When a study integrates both qualitative and quantitative data, however, the researcher may be in a much stronger position to derive meaning immediately from the statistical findings (p. 262).

Using mixed methods design can benefit from the strengths of the two approaches while minimising their weaknesses. By combining both the qualitative and quantitative methods, a more comprehensive picture will be obtained by “noting trends and generalisations as well as in-depth knowledge of participants' perspectives” (Creswell & Plano Clark, 2007, p. 33). Specifically, the mixed methods approach is used to inform, complement and clarify the research phases and results.

However, there are several challenges associated with mixed methods research. Gorard (2004) argues that mixed methods research requires a greater level of skill. It may require extra time, effort and resources (Bryman, 2007; Creswell & Plano Clark, 2007). Additionally, a major obstacle facing researchers who gather qualitative and quantitative data is that such designs are often expensive (Polit & Hungler, 1999). In addition, reconciliation of the dissimilar research philosophies may initiate difficulties and complications in the research findings and their interpretation (Bryman, 2007). Merging analyses of quantitative and qualitative data to present an integrated analysis can be also challenging (Bryman, 2007).

4.4 THE FIRST PHASE: EXPLORATORY STUDY USING FOCUS GROUP

This phase is an extension of the literature search started earlier to construct the research theoretical model. The exploratory study aims at identifying other factors that

might influence the adoption of e-learning. Additionally, it aims at generating questionnaire items to measure the identified factors.

As discussed in Chapter Two on the theoretical framework, the theory of Planned Behaviour (Ajzen, 1985), postulates that behaviour is determined by BI, which is in turn determined by three factors namely, attitude towards the behaviour, SN regarding the behaviour and PBC or control factors. For a deeper understanding of the behaviour, the three possible determinants of BI can be further decomposed into their salient beliefs, i.e. attitudinal beliefs, normative beliefs and control beliefs (Taylor & Todd, 1995a). The research conceptual model incorporates such salient beliefs. As such, the instrument will not only measure the three determinants (direct factors) of BI namely, attitude, SN and PBC, it will also measure the salient beliefs (indirect factors) that form the direct constructs. In order to identify these salient beliefs and generate items to measure them, an elicitation study guided by Francis, Eccles, Johnston, Walker, Grimshaw and Foy (2004) and Ajzen's (2006) recommendations was conducted.

Central to the theories of Reasoned Action (Fishbein & Ajzen, 1975) and Planned Behaviour (Ajzen, 1985) is the development of the instrument that measures the constructs of these theories. Indeed, one of the strengths of this line of research is the great attention given to the construction of its measurement. Several publications are available, including a book (Ajzen & Fishbein, 1980), a manual (Francis et al., 2004), and a paper (Ajzen, 2006) that provide guidelines to assist in developing measurements for the theories. Since this research is built on this theoretical frame, these guidelines were followed so as to identify the most salient beliefs underlying attitude, SN and PBC. Ajzen and Fishbein (1980) and Francis et al. (2004) recommended questionnaire items be generated from an elicitation study administered to a small sample from the population under investigation. An elicitation study is a "qualitative investigation of a subset of a population under investigation, to discover the salient behavioural, normative and control beliefs about the behaviour" (Francis et al., 2004, p.32). This stage was essential, as diverse populations may have dissimilar beliefs regarding the target behaviour, that is the adoption of e-learning (Ajzen & Fishbein, 1980). In this research, an online focus group was conducted. The steps involved in the online focus group are discussed next.

4.4.1 THE ONLINE FOCUS GROUP

The purpose of the focus group study was to identify and conceptualise relevant constructs (salient attitudinal, normative and control beliefs) and generate items to measure them. The focus group interview is a data collection technique that involves a number of individuals with similar experiences being interviewed by a researcher or moderator with the aim of eliciting ideas about a specific topic (Bloor, Frankland, Thomas, & Robson, 2001). Emphasis is to gain insights through group opinions rather than to obtain facts (Anderson & Kanuka, 2003). The unique feature of the focus group method is that it is "interaction focused" (Morgan, 1988, p. 9). This interaction, as

Krueger and Casey (2000) note, allows the researcher to get in touch with participants' perceptions and attitudes in a way that other research techniques do not permit.

Using focus group interviews is appropriate because it helps yield rich insights into the perceptions of the target sample and has been successfully incorporated with the constructs of TRA and TPB (Francis et al., 2004). Moreover, focus group interviews offer insights into the views of several participants in a single interview session as opposed to individual interviews. However, the method can suffer from unbalanced participation when some participants dominate the discussion. Nevertheless, such limitations can be avoided by good moderating of the discussion.

Focus groups can be used at the preliminary or exploratory phases of a research, during a study or after a main study has been completed as a way to gain deeper insights (Krueger & Casey, 2000). They can be also adopted as a main technique in the research or as a complement to other methods (Morgan, 1988). Data collection using focus group interviews has been employed extensively in education and social sciences (Holsti, 1969).

The increasing prominence of the internet as a means for communication has opened a new arena for researchers where they can conduct their research or collect data. The World Wide Web is a rich domain for the collection of data (Wright, 2006). Online communities have flourished, and hundreds of thousands of people regularly participate in discussions about almost every conceivable subject (Bakardjieva, 2005). An online focus group is a unique type of focus groups that is conducted online. These groups can be carried out on the internet either synchronously or asynchronously and with text-based software and/or audio and video software (Anderson & Kanuka, 2003). Synchronous focus groups take place in real time. In this case, the researcher or moderator asks a question and participants answer immediately as in chatting rooms. However, this method can be "fast, furious and highly interactive" (Mann & Stewart, 2000, p. 102). An asynchronous method does not occur in real time. In this instance, the researcher posts the question and the respondents answer at anytime when they are online as in forum discussions. This method can overcome differences in participants' levels of typing skills as well as differences in time zones (Mann & Stewart, 2000). Asynchronous focus group discussions tend to be more successful than synchronous discussions (Anderson & Kanuka, 2003). They are considered less immediate but more personal and thoughtful (Mann & Stewart, 2000).

In recent years, online focus groups have become increasingly visible in psychological literature (O'Connor & Madge, 2003). The greatest advantage of the online focus group method over the traditional method is that it can be more economical in terms of time and cost. It can also reach a large number of individuals more easily. For example, the existence of virtual communities of individuals with similar interests or conditions online allows the researcher to reach hundreds of people very quickly, regardless of their probable separation by vast geographic distances. Moreover, the online focus group method takes advantage of the capacity of the internet to offer access to groups and individuals who would be difficult, if not impossible, to reach through

other channels (Wright, 2006). Such groups can overcome distance and time constraints. This method is also helpful in eliminating transcription time and effort since transcripts are generated (Fox, Morris, & Rumsey, 2007). In addition, this method can decrease power struggles that characterise face-to-face focus groups as a result of conflicting opinions (Anderson & Kanuka, 2003). Unlike in a face-to-face group, participants in an online group do not have to wait for their turn to speak. Thus, such a method offers greater equality in participation (Reid & Reid, 2005). The ‘visual anonymity’ of online focus groups and the ‘psychological distance’ of the internet can stimulate participation (Reid & Reid, 2005, p. 132). As Horn (1998) points out cyberspace offers “the perfect combination of distance and intimacy” (p. 295).

However, there are some drawbacks associated with the method that result from the internet for it is still not accessible to everyone. As such, certain individuals with similar characteristics (e.g. male, affluent and young) can be overrepresented. In addition, the loss of personal contact does not help in building the necessary rapport between the researcher and the participants (Bryman & Bell, 2007). Text-based asynchronous focus groups lack paralinguistic cues (e.g. facial expression, body posture, gesture, intonation pattern and volume). Paralinguistic cues constitute another important source of data (Anderson & Kanuka, 2003). Finally, there are concerns over confidentiality and issues of fraud and hackers that may discourage interaction (Hewson, Yule, Laurent, & Vogel, 2003).

4.4.2 RATIONALE FOR USING THE ONLINE FOCUS GROUP

The rationale for using the focus group method was to elicit the students’ views and perceptions about e-learning. Eliciting their views will help in identifying the salient beliefs regarding e-learning, that is how the students perceive this technology. Focus groups can be useful for collecting data about attitudes, perceptions and opinions (Anderson & Kanuka, 2003). They are not meant to reach censuses among the participants. Rather, they stimulate in-depth exploration of a subject when little is known. The data resulting from the focus group discussions will be also used to develop items for the main study instrument. The main advantage of this method is the large amount of data that can be gathered in a short time (Morgan, 1988). Moreover, conducting the focus group discussion over the internet is a cost-effective method when the researcher and participants are in different geographic areas (Anderson & Kanuka, 2003).

4.4.3 DESIGN

This research has adopted an asynchronous online focus group method. This method was chosen over a traditional face-to-face focus group for two reasons. Firstly, the population from which the sample to be drawn was not accessible. The researcher was located overseas and it was not easy to travel to conduct this study. Thus, the online focus group was very appealing as it can easily overcome the distance barrier. Secondly, the goal of this exploratory phase was to elicit university students’ salient beliefs about

e-learning; thus, the sample should include internet users who have an idea about this technology. The online existing social groups provide a practical method of recruiting participants (Williams & Robson, 2004). The online focus group in this situation will easily reach and ensure a sample with such characteristics.

4.4.4 SAMPLE

Two issues should be considered in regard to the focus groups sample: who should participate and how big should the sample be. The selection of participants depends on the purpose of the focus group study (Mann & Stewart, 2000). In this study, the objective was to explore university students' salient beliefs regarding e-learning, that is how they perceive e-learning. Hence, the selected sample included university students. To ensure a representative sample, in the invitation posting, the researcher stated clearly who should participate in the discussion with this statement (see Appendix 4A for the welcoming posting):

"I would like to know your views and perceptions, in particular, all undergraduate students, males and females, full-time or part-time, in any faculty, from Jeddah or outside it, you are all welcome to express your opinions"

The sample size of the focus group was another key issue. In a face-to-face focus group, too many participants can be difficult to moderate (Bryman & Bell, 2007). Similarly, in a synchronous virtual setting the more participants, the more interactive an online focus group discussion might become, and consequently, the more difficult the moderation due to the fast pace of interaction. Participants who can type quickly would dominate the discussion and have the greater control of the tone and direction of the dialogue (Mann & Stewart, 2000). In contrast, in an asynchronous online focus group, this problem does not exist (Anderson & Kanuka, 2003). Because the asynchronicity, there are no time constraints. Thus, the number of participants can be limitless (Bryman & Bell, 2007). However, this is not advisable. As in a traditional focus group the ideal number of participants will depend on the purpose of the study. In this study, the sample size was not determined *a priori* because it is impossible to discern who will contribute from the usually large number of invisible 'lurkers'³. The number of participants was determined by continuing the discussion until comments and themes began to repeat and little new information was being generated, thus indicating saturation. Saturation is a term used to describe "the point when you have heard the range of ideas and aren't getting new information" (Krueger & Casey, 2000, p. 26). Therefore, the researcher used to visit the web site regularly to check the postings' contents and decide when to halt the discussion. Over a five-week period, seventeen students participated and expressed diverse views and perceptions. The profile of those participants will be presented with the results of the study.

³ In Internet culture, a lurker is an individual who only reads discussions on interactive web tools such as a message board and does not actively participate.

4.4.5 SET-UP REQUIREMENTS

Similar to traditional focus groups, online groups have certain logistical requirements (Mann & Stewart, 2000). Specific to the online focus group is the selection of suitable software that allows the execution of the discussion. There are numerous applications built for this purpose, some of which allow in addition to audio capabilities, video streaming (e.g. Elluminate Live and VideoDiary™ see figure 4-1). In addition, many Learning Management Systems incorporate features that enable online discussions. A simple web browser such as Mozilla Firefox and Microsoft Internet Explorer can be used too. In this research, any web browser could have been used to access the web-page where the discussion was planned to take place.

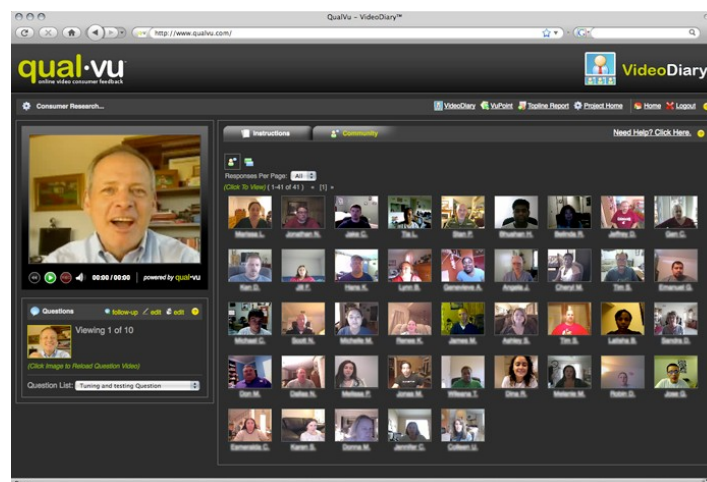


Figure 4-1: A screen shot of an online focus group software (VideoDiary™)

The venue for conducting a face-to-face focus group is a key issue that the researcher should carefully consider. In a conventional focus group study, the venue should be easy to locate, safe and with adequate facilities. In the virtual world, such criteria are also applicable. In choosing the site for carrying out the discussions, the researcher chose a discussion web site that is visited and used greatly by university students. The selected site was *Saudi Universities site*: <http://www.ksau.info/vb/>. The discussion forum is developed and maintained by students and hosts other academic services as well. Choosing this web site over non-student web sites offers a relaxing and non-threatening environment where the students feel in a place belonging to them. This sense of intimacy is reflected in the adage of the web site “a site for all students to share their interests and interact”.

4.4.6 METHOD

Focus group participation was voluntary in that any student feeling interest in the topic posted could participate. Consent was not required for participation as it was open to any student. However, permission was sought to use the responses in the thesis. This was conveyed in the welcoming message (see Appendix 4A). The first post sent by the researcher (for opening the topic as a new thread in the forum) started with a welcoming

message that contained information about the researcher, the study, the purpose of the focus group, and instructions on how to participate. The researcher asked the participants to give certain demographic information about themselves, and then answer the three questions posed. In developing the questions, the guidelines suggested by Ajzen (2006) were adopted and the following questions were posted on the forum website:

What are the advantages and disadvantages of using e-learning for your university study and why?

Who approves or does not approve, encourages or does not encourage your usage of e-learning for your university study?

Can you identify any issues that might influence your decision to use or not use e-learning for your university study?

In the absence of face-to-face contact, clarification might be difficult; therefore, the researcher tried to keep the questions as clear as possible so that the participants would find it easy to respond.

Moreover, the creation of a comfortable and relaxed environment is an important criterion for a successful focus group (Mann & Stewart, 2000). This can be achieved in a face-to-face setting by offering refreshments, name tags and informal chatting. This is also true for online focus groups, even in the absence of a physical environment. In this study, as mentioned above, the researcher chose a special web forum for university students. Additionally, since it was not possible to see the face of the researcher in this text-based interaction, the researcher made use of emoticons and smileys in the welcoming message to establish a friendly atmosphere of the online group (sample pages are displayed in Appendix 4A). Emoticons and smileys are graphical symbols and animations representing feelings and emotions. For example, they can represent happy or surprised faces. Participants could also use a range of these symbols to denote the tone of their contributions as the forum interface provided a wide range of them.

Over the duration of the focus group discussion, the researcher posted several comments to encourage interaction between the participants and assure them that their contributions are important. Sometimes, no new comments were posted for more than two days or so, therefore the researcher posted further messages to encourage participation. Some students were very cooperative and encouraged other students to interact.

The thread continued for a period of five weeks in which the researcher visited the site regularly to check comments and add clarifications. Very often, the researcher posted *thank you* and *recap* messages to give other participants and lurkers the sense that the discussion is going on. Almost all the responses were informative and provided rich information reflecting varied perceptions. Once the responses started to become repeated and the discussion reached the saturation point in which no new information was coming up, the researcher decided to halt the discussion and posted a thank you message.

4.4.7 ANALYSIS AND RESULTS

The online focus groups resulted in a data set of thirty-one messages including the moderator's comments and postings (see Appendix 4A for screen shots of some postings). Data was collected over five weeks. Obviously, a lengthy period to generate useful data can prove a major drawback for conducting a focus group over the internet, but overcoming the distance barrier justified the choice.

Seventeen students participated and their demographics are shown in table 4-1.

Table 4-1: Focus group participants' demographics

Demographics		N
Gender	Male	9
	Female	8
Mode of study	Full-time	9
	Part-time	8
Place of residence	Urban	7
	Rural	10
Total		17

The responses were copied and pasted into an *MS Word* document. The responses were content-analysed by highlighting every belief or perception expressed by the students. The researcher decided to analyse the data manually without using any software because the main categories of the content were known (i.e. attitudinal, normative and control beliefs). The analysis needed only to decide on which statement belonged to which specific category or theme. The text was read several times while highlighting the words thought to represent a salient belief, i.e. feature associated with e-learning, important other or control issue. This process was done several times. Next, the words or phrases were all grouped into the three *a priori* categories: attitudinal beliefs, normative beliefs and control beliefs. The process of categorising them was facilitated by the fact that the researcher had posited three questions to address each category. Thus, some students could express a number of beliefs under each question. However, some did not stick to answering the questions in order; instead, they responded to all three questions in one connected paragraph. The different beliefs are described in the three sub-sections below.

4.4.7.1 Attitudinal beliefs

The students expressed a diverse range of attitudinal beliefs, which were grouped into two categories: beliefs of flexibility and interactivity.

4.4.7.1.1 Perceived Flexibility

The most frequent salient belief associated with e-learning was flexibility. E-learning was perceived as a very enabling and flexible tool in terms of time and distance. The students can have access to the academic contents at all times no matter where they are. One student put it this way:

*“The most important feature of e-learning is its **flexibility in terms of time** it offers the students, this issue is vital for me and any students who does not like to stick to fixed lectures times.”* (a rural full-time male student)

*“It is easy for me **to be anywhere** and still be able to use it if I have time. Unlike the conventional education system which restricts me with specific time, specific place and limited period.”* (an urban full-time male student)

Some students also perceived the flexibility of e-learning as easing the burden of travelling and commuting to the university from distant places. A female part-time student expressed in a sad tone (by using lots of crying graphical faces) a wish for the provision of online courses as such courses will help her to continue her studies from her city. She commented:

*“When KAU offers such courses...I will be the first to enrol...it will help me to **overcome travelling** ...whenever there is an exam, my husband drives me from Taif to Jeddah to sit for the final examination and this costs us a budget, if such **flexible** online education is offered, I will be able to study from house.”* (a rural full-time female student)

*“I prefer online courses as I’m living outside Jeddah and definitely this will **save me coming** to Jeddah and to find the lecture cancelled”* (a rural full-time male student)

Moreover, some students perceived e-learning as a flexible tool that allows them to pursue their studies while, at the same time, keeping other commitments such as caring for children or parents or job:

*“I think e-learning is suitable for people like me...I have three daughters and when I go to the university I feel as if my heart stays with them all the time, e-learning is good for students like me with kids and house chores... It will be very **flexible in allowing me to study and care for my kids**.”* (an urban full-time female student)

*“..being an employee, e-learning is advantageous to me for several reasons...it will help me to develop my skills **without the risk of leaving my job**...”* (a rural part-time female student)

E-learning is also perceived as providing greater control over the students’ studies as reflected in these students’ comments:

*“It is much better now, we **can sort out lots of problems** associated with our studies...like adding one course or changing a section or deferring an exam...we can modify our information and print out application forms needed for special purposes like purchasing a discounted ticket...”* (a rural part-time male student)

*“I remember a friend of mine who had an operation abroad and I **managed to defer** his exam via the course website...”* (an urban full-time male student)

4.4.7.1.2 Perceived Interactivity

The students also indicated that e-learning is an interactive tool that allows very effective communication with their tutors and peers. For example, a student commented that the tools provided by e-learning such as email and discussion forums are:

*“helping us in our learning tasks to the extent that students and instructors ... **can interact via the email or the bulletin boards.**”* (a rural part-time male student)

*“The advantage is in the **communication between the students.**”* (a rural part-time male student)

*“if e-learning is implemented, it will benefit us part-time students most... [it allows] **communication between the students, especially part-time...**”* (a rural part-time female student)

*“We got help from graduated students by using these forums...we **communicate and benefit from their experience.**”* (an urban full-time female student)

*“I **meet and interact with new friends and exchange** information and notes through this discussion forum.”* (an urban part-time female student)

E-learning is also perceived as an interactive system because it allows the students to reach their tutors:

*“I can **communicate with my tutors** at anytime even after office hours.”* (an urban full-time female student)

*“Usually e-mail is the best way to **communicate with tutors.**”* (an urban part-time male student)

4.4.7.2 Normative beliefs

In answering the second question, peers, family and instructors were the important other people to the students regarding approving and encouraging e-learning.

*“...my part-time **friend** was praising the internet for me and he convinced me to have a go myself.”* (an urban part-time male student)

*“My **sister-in-law** is not allowed to use the internet by her parents, although her brother is doing a PhD in the UK in computer sciences?”* (an urban part-time female student)

*“I am in struggle with my **family**, they object everything associated with the internet, but I do not give up.”* (a rural part-time female student)

*“My **family** will not intervene in this matter.”* (an urban full-time female student)

Instructors were also mentioned twice:

*“My **instructor** insists on using the internet for our essays...”* (an urban part-time female student)

4.4.7.3 Control beliefs

In answering the third question, the participants listed a range of obstacles that might hamper their use of e-learning. Almost all the participants mentioned cost as an obstacle:

*“I guess it is **expensive**, although the new offers from Mobily [an Internet Service Provider] are encouraging...but still is **costly** compared to other countries like Egypt.”* (an urban full-time male student)

Some students stated that the internet speed is not satisfactory for educational purposes such as lectures video streaming.

*“...**cost** is unquestionable and also the **slowness of internet connection**...”* (an urban part-time female student)

Another factor mentioned by some students was the lack of internet connection points in the university campus:

*“...the library has some computers connected to the internet but it is not enough at all, they should provide in every faculty and department **internet access**”* (an urban part-time female student)

4.4.8 SUMMARY OF THE FOCUS GROUP RESULTS

The purpose of the online focus group discussion was to identify some of the salient beliefs the students associate with e-learning. This technique was very useful for the survey instrument development. It was possible to identify and reveal several beliefs the students associate with e-learning. The data was also helpful for generating items to tap these beliefs. Using this technique offered a timely, inexpensive approach to obtain important information. A good amount of qualitative data was generated and then analysed. The generated beliefs are summarised in table 4-2.

Table 4-2: Summary of elicited beliefs from the focus group study

<i>Belief category</i>	<i>Salient beliefs</i>
Flexibility	Flexibility as to time and place.
Attitudinal beliefs	Flexibility in permitting studying while keeping other commitments.
	Save commuting.
	Flexibility in studies management.
Interactivity	Communication with other students. Communication between students and tutors.
Normative beliefs	Instructors, peers, family
Control beliefs	Cost, speed, internet access on campus, desk help for technical problems, training for using the internet, general support for e-learning

4.4.9 *ETHICAL CONSIDERATIONS*

Research ethics concerns “the responsibility of researchers to be honest and respectful to all individuals who may be affected by their research studies or their reports of the studies’ results” (Gravetter & Forzano, 2009, p. 98). Ethical considerations for the focus group method are similar to those in most other methods of social research (Homan, 1991). However, using the internet as a medium for collecting data raises specific ethical issues for online focus groups (Bryman & Bell, 2007). Issues of confidentiality, anonymity and informed consent should be considered attentively especially if the web sites used are available to non-subscribing members. This study tried to address these issues in the welcoming messages (see Appendix 4A) by stressing that participation is voluntary and stating that there is no potential risk anticipated by participating. Additionally, the researcher made the students aware that some extracts from the thread will be included in the thesis. Moreover, the forum where the focus group discussion took place required registration and enabled password protection, thus offering a degree of security and confidentiality. However, complete protection of confidentiality and anonymity are difficult to guarantee on the internet (Stewart & Williams, 2005), yet there is an implied agreement by all participants on this issue.

4.5 THE SECOND PHASE: MAIN SURVEY USING QUESTIONNAIRE

4.5.1 *THE SURVEY*

The main strategy for collecting the data in this research was a survey employing a questionnaire. The survey is the most widely used method in technology adoption research (Choudrie & Dwivedi, 2005). This strategy has been used for many years and the early examples of it date back to the onset of the seventeenth century (De Landsheere, 1988). A survey is “a series of self-report measures administered either through an interview or a written questionnaire” (Stangor, 2007; p.103). In this strategy, the researcher identifies a sample, collects quantitative data through questionnaires or interviews and statistically analyses the data to answer research questions or test hypotheses then draws conclusions or makes inferences about the population (Creswell, 2005). This design is typically used to “scan a wide field of issues, populations, programmes etc. in order to measure or describe any generalised features” (Cohen, Manion, & Morrison, 2007, p. 206). Survey studies that involve a large number of respondents permit generalising about the population (Rea & Parker, 2005). The survey is thus the most appropriate method for obtaining personal, self-reported information that is not accessible elsewhere and if generalisation of results to a wider population is wanted (Rea & Parker, 2005).

There are two basic designs of survey research: cross-sectional and longitudinal. A cross-sectional survey design allows the collection of data about current attitudes, opinions or beliefs. Longitudinal designs are used to survey respondents over time (Creswell, 2005). This research adopts a cross-sectional strategy, in that it gives a

snapshot of the population at a specific point in time (Kumar, 2005). The strength of such cross-sectional design lies in that it is comparatively quick and cheap to conduct. However, it does not allow measuring change (Cohen et al., 2007).

4.5.2 RATIONALE FOR USING THE SURVEY STRATEGY

In a review of 48 articles on technology adoption and usage, Choudrie and Dwivedi (2005) examined the methods used for studying technology adoption at the individual and organisational levels. They found that the survey strategy was used mainly for researching adoption at the individual level, while the case study method was mostly used for investigating the organisational level. The rationale for using a survey stems from the nature of the research which aims at investigating factors that influence students' intention regarding the adoption of e-learning. A survey design is the only method that can be used to describe the characteristics of a large population (Weisberg, Krosnick, & Bowen, 1996).

In addition, the research model is one in which several variables are involved. The survey strategy is appropriate for examining a large number of variables as they occur in their realistic settings without the need to manipulate them as in experiments (Kothari, 1990). This approach allows an economical study of multiple variables.

4.5.3 SAMPLE

In referring to sampling as “the basis of all research”, Gorard (2001) emphasises the importance of selecting a research sample. He contends that the apparent conclusions of research are determined largely by the nature of the samples used to collect data (Gorard, 2001). The most important feature of a good sample is its representativeness of the intended population (Stangor, 2007). If the sample is carefully selected to be representative of the population it was drawn from, then generalisation can be made about this population from it.

A major objective of the current research is to generalise the outcomes resulting from the sample statistics to the larger population of university students; hence, it is necessary to design a sample that is representative with minimum sampling error. This section describes the research sample, its method and its size.

A sample is “a portion or subset of a larger group called a population” (Fink, 2003, p. 1). This population is the whole group or universe to be sampled and consists of objects or elements such as students. The process by which the researcher selects the elements that will represent the larger population is called sampling. Sampling is useful for its efficiency and precision. As compared to studying the whole population, using a sample requires less time, cost and effort in the collection and processing of data.

In quantitative research, large samples are more recommended than small ones. Some statistical analyses such as factor analysis, Structural Equation Modelling (SEM) and multiple regression analysis require large numbers of observations in order to give reliable results (Cohen et al., 2007). Gorard (2001) also strongly advocates using large

samples because “cases in the sample will be lost at several stages” (p. 60). This can happen because of non-response or unintelligible answers. Therefore, the sample should be big enough to be able to fulfil the research objectives.

The population of this research was all enrolled students at King Abdul Aziz University during the 2007/2008 academic year (N=33909) (King Abdul Aziz University Facts Book, 2007). The selected sample consisted of 550 enrolled graduate students at King Abdul Aziz University. A more detailed account of the study sample is given in the next chapter in the respondents’ profile section.

4.5.3.1 Research sampling method

The term sampling refers to the selection of research subjects (Graziano & Raulin, 2007). Sampling methods are usually classified into two types: probability (random sampling) and non-probability (purposive sampling) (Cohen et al., 2007). In probability sampling, every element in the population has a known, non-zero chance of being selected. This method is based on random selection of the elements, thus eliminating any subjective decisions by the researcher. The following methods exemplify this type. Simple random sampling: involves selection of elements from a complete list or sampling frame one at a time and independently; stratified sampling: implies dividing initially the population into strata followed by a random selection of elements from each stratum in a way similar to simple random sampling; and cluster sampling: involves randomly the selection of clusters of elements, i.e. groups rather than individual elements.

On the other hand, in non-probability sampling, the probability of selecting any elements of the population is not determined, as knowledge of the population is limited (Rea & Parker, 2005). Examples of non-probability sampling include: convenience sampling: in which the easiest to access elements are chosen; quota sampling: in which a set of selection criteria is used to identify and choose the sample conveniently; snowball sampling: which refers to the selection of respondents in which the chosen respondents lead to other respondents; and purposive sampling: in which selection of elements is based on the researcher’s judgments about their appropriateness (Pole & Lambard, 2002).

4.5.3.2 Rationale for choosing the research sampling method

As discussed earlier, understanding the factors influencing the students’ intentions to adopt e-learning is crucial to ensure a successful implementation and use of e-learning (Ndubisi, 2004). The aim of this study is to examine these factors by studying only a fraction of the university students. Yet, for policy-makers and educators the findings of the study will be useless if they only apply to the studied sample. Therefore, the value of the findings will be maximised if these findings can be generalised to the whole population of the university students. The most adequate way to achieve this generalisability is to create a representative sample (Babbie, 2004). A representative sample is characterised by small sampling error. Sampling error can be influenced by

two elements in the sample design: sample size and homogeneity of its elements. A larger sample has a smaller sampling error than a smaller one. Further, a homogeneous population gives samples with smaller sampling errors than does a heterogeneous population (Babbie, 2004).

Probability sampling methods provide an efficient way for choosing a sample that rightfully mirrors the variations existing in the population (Babbie, 2004). As a result, the findings from such sample can be generalised to the whole population more safely than by a non-probability sample. However, representativeness does not need to be present in all aspects. It is sufficient to be limited to the characteristics of interest and relevance to research (Babbie, 2004). Hence, to ensure a representative sample with as little sampling error as possible, the sample for this research was a large probability sample (n=550) chosen by a stratified cluster sampling method (Kish, 1995).

Stratified sampling involves an initial separation of the elements of the population into mutually exclusive groups or strata based on certain criteria followed by a random selection of elements from each stratum. Instead of selecting the sample from the whole population, choosing a sufficient number of elements from homogeneous subgroups of the population will ensure a better representativeness. It is most useful when the population is heterogeneous, as stratification will ensure the presence of the desired criteria and hence reduce sampling error (Pole & Lambard, 2002).

Cluster sampling is employed when it is impossible or impractical to select individual elements from the population because of difficulty in compiling a sampling frame or because of administrative inconvenience (Babbie, 2004). The central advantage of cluster sampling is that of saving time, cost and effort. Yet, it generally increases sampling error and decreases accuracy (Gay, Mills, & Airasian, 2006). Nevertheless, if the elements in all clusters have been allocated into their natural clusters at random, the research findings should not be biased (Pole & Lambard, 2002). In addition, maximising the number of clusters chosen while minimising the numbers of elements within each cluster can also reduce the negative effect of cluster sampling on the precision of the outcomes (Babbie, 2004).

4.5.3.3 Approaching the sample elements

Initially, the population of the university students was stratified by a variable of interest, specifically, gender. In addition, the two main strata of male and female students were further stratified by two variables of interest, students' mode of study (full-time and part-time) and faculty. The main function of this stratification was to categorise the population into homogeneous subgroups to enhance representation of the elements from these subgroups (Brown, 1988). The second stage involved selecting clusters randomly from each identified population stratum. The natural clusters in this case are the different sections. It is important to note that the students are randomly assigned to several sections by the university administration. All the students in these randomly selected sections were then approached. Then the questionnaires were distributed to the students during lectures times.

It is also worth noting that since the study context is sex-segregated, in distributing the questionnaire to the female section, the researcher herself carried out the administration of the questionnaires. While in the male section, another proxy researcher administered the questionnaire following specific procedures by the primary researcher.

4.5.4 THE TECHNIQUE EMPLOYED TO GATHER THE SURVEY DATA

The current research employed a questionnaire for data collection. The main reason for choosing this technique is that it is the most appropriate method to generate data appropriate for the research objective that is hypotheses and models testing (Fife-Schaw, 2006). A questionnaire is “a set of fixed format, self-report items that is completed by respondents at their own pace” (Stangor, 2007, p. 104). This technique is widely used for collecting survey information. It gives structured and often numerical data (Cohen et al., 2007). Questionnaires can be used to elicit data for numerous purposes such as test development and validation, population parameter estimation and hypothesis and model testing (Fife-Schaw, 2006).

The questionnaire has several advantages. It is more practical and economical than other techniques such as interviews because a considerable number of questionnaires can be sent via mail or email cheaply and quickly (Sarantakos, 2005). Thus, it permits a broader coverage of respondents, because the researcher can approach respondents with more ease than with other techniques. The use of questionnaires can also lessen the influence of the researcher on the respondent’s answers. Therefore, questionnaires are more successful in eliciting sensitive information such as income, age or personal behaviours as they are more anonymous than other techniques such as observation.

However, this technique has some limitations. It does not permit probing and clarification of questions. Furthermore, in a questionnaire, unintelligible answers are difficult to correct, and missing data is inevitable. In addition, it is difficult to use the questionnaire with some respondents (e.g. illiterates). Moreover, with mail questionnaires, there is the possibility that someone other than the intended person might complete the form. This technique may suffer also from low response rate (Bryman, 2008). However, to avoid many of the pitfalls associated with the questionnaire technique, the research distributed and collected the questionnaires on the same occasion (during lectures time) allowing for clarification and a high response rate.

4.5.5 DEVELOPMENT OF THE QUESTIONNAIRE

The development of the research questionnaire was a major part of this research because the questionnaire was the main technique used to collect the research data. As such, careful steps were taken in its development and validation. In developing and validating this instrument, the paradigm for construct measurement suggested by Churchill (1979) and guidelines recommended by Francis et al. (2004) and Ajzen (2006) were followed. Moreover, the heuristics and guidelines suggested by Straub,

Boudreau & Gefen (2004) to establish validity and reliability were followed. The development process had two main phases. An initial phase, which was described above, involved the online focus group study to identify variables and generate items for the questionnaire. The second phase involved piloting and refining the questionnaire through a number of iterations. As the process of the questionnaire development and validation was lengthy and extensive and involved several phases, a separate chapter is devoted to describe it (Chapter Five).

4.5.6 ETHICAL CONSIDERATIONS

The questionnaire is a useful tool to gather personal information from respondents, yet it can be considered as an intrusion into their lives (Cohen et al., 2007). In addition, questionnaire respondents are not passive participants; they may react to any item in the questionnaire if they feel it is offensive, irritating, biased or misleading (Cohen et al., 2007). It is, therefore important to address research ethics when human subjects are involved in a study. As a first step to ensure ethicality in the research, prior approval to conduct the study was sought from the University of Leicester (with which the researcher is affiliated) as well as from King Abdul Aziz University (where the study will take place). For the University of Leicester, an application along with a summary of the research was forwarded for ethical approval and the agreement for carrying out the study was received subsequently. For King Abdul Aziz University, a letter soliciting permission to distribute the questionnaires within its premises along with the questionnaire was sent to the Deanship of Scientific Research and permission was granted.

Gravetter and Forzano (2009) maintain that the researcher should provide all available information about a study so that an individual can decide to participate or not. Therefore, the purpose of this research was explained to the participating students during administration. In addition, a brief introduction to the research purpose was provided on the cover sheet of the questionnaire. The students were also informed (orally and on the cover sheet) that all the data arising from the research would be destroyed once the research is completed. Finally, on the cover sheet of the questionnaire, the following issues were made clear:

Respondents' right to withdraw at any stage;

Confidentiality of their identities and responses;

The respondents can be informed of the research results once it is finished by emailing the researcher on the provided email address.

4.5.7 LIMITATIONS

Although the survey design is the most useful method to gather large-scale data, this strategy has some limitations. If the purpose of the study, as Cohen et al. (2007) state, "is to catch local, institutional or small scale factors and variables – to portray the specificity of a situation, its uniqueness and particular complexity, its interpersonal

dynamics”, then the survey is not an appropriate strategy. Further, surveys cannot offer fine details of the situation (or depth); rather, their focus is on breadth of coverage (Oates, 2006). As such, the survey strategy has a limited degree of explanatory potential (Cohen et al., 2007).

4.6 THE THIRD PHASE: SEMI-STRUCTURED INTERVIEW

In this study, the interview technique was used to collect qualitative data in a follow up stage. The interview is a conversation that has a structure and a purpose determined by the interviewer (Kvale, 2007, p. 7). Unlike daily spontaneous interactions, the interview does not occur by chance; rather it is planned (Oates, 2006). It is a professional communication that involves careful questioning and listening (Kvale, 2007).

The interview may be used as the main technique for data collection or may be employed in conjunction with another. It is useful when the researcher wants to:

- obtain detailed information;
- ask complex or open-ended questions;
- explore emotions and experiences that cannot be easily observed or described; and
- investigate sensitive topics or privileged information, that the respondents might not be willing to write about on paper (Oates, 2006, p. 187).

There are different types of interviews. Kvale (1996) suggests the interview can be placed along a continuum. According to his classification, the interviews may differ in their openness of purpose, degree of structure, extent to which the interviews are exploratory or hypothesis-testing, and whether they are descriptive or interpretive or cognitive-based or emotion-based. Oates (2006) summarises interviews into three categories: structured, semi-structured and unstructured. Structured interviews are pre-determined and standardised. In other words, all interviewees are given exactly the same context of questioning and the answers are usually closed ended (Bryman & Bell, 2007). These types of interview are very similar to questionnaires in that both promote standardisation of the asking of questions and the recording of answers. Another type of interview is the semi-structured. In this type, there is still a list of questions and themes to be covered, yet there is more flexibility. For example, the researcher may change the order of the questions or ask further questions. At the same time, the interviewee can talk in more detail and in a more open way. Finally, the unstructured interview is characterised by less control and more freedom is given to the interviewee in responding to questions. There may be just a single question prepared by the interviewer; any additional points to be asked may emerge from the interviewee’s speech (Bryman & Bell, 2007).

This research has used the semi-structured interviews to collect qualitative data. In the semi-structured interview, the researcher “has a list of questions on fairly specific topics to be covered, often referred to as an *interview guide*, but the interviewee has a great deal of leeway in how to reply” (Bryman & Bell, 2007, p. 474). In general, all the questions will be asked of all interviewees, yet there can be a degree of flexibility in the ordering of the questions.

Although the semi-structured interview is very useful in generating rich data that cannot be obtained through the questionnaire, it is time-consuming in that it requires a long time to conduct and analyse.

The semi-structured interview technique was chosen over the other types of interview because it is more fit for purpose at this stage which is mainly directed towards shedding light on the unexpected results which have emerged from the second stage of the research or the quantitative data. Unlike in unstructured interviews, the scope of issues to be covered in a semi-structured interviews is already known, in this case, the researcher has specific questions to ask regarding some rejected hypotheses. Thus, the semi-structured interview was more appropriate.

4.6.1 STAGES OF CONDUCTING INTERVIEWS

The stages suggested by Kvale (2007) to conduct the interview guided this phase. Kvale (2007) suggested seven stages for an interview inquiry. These start with a *thematisation stage* in which the purpose and topic of the investigation are formulated (the whys and the whats). The second stage is the *designing stage*, or planning the procedures and techniques of all the steps of the interview (the hows). The third stage is *interviewing*, or the execution of the interview. The fourth stage is *transcribing* which involves preparing the interview material for analysis. The fifth stage is *analysing, or deciding* on an appropriate method of analysis. The sixth stage is *verifying*, that is ascertaining the generalisability, reliability and validity of the findings. The seventh and final stage is *reporting* or describing the way the interview procedures and findings are communicated.

4.6.1.1 Thematising

This stage involved clarifying the purpose of the semi-structured interview. The purpose of using the interview was to clarify any unexpected outcomes from the main study.

4.6.1.2 Designing

At this stage, the interview schedule is prepared. This involves formulating the questions to be asked during the semi-structured interview. The topics covered in the interview were derived from the rejected hypotheses. A cover letter explaining the purpose of the interviews was designed; it has also statements guaranteeing the confidentiality of the interviewees (see Appendix 4B).

4.6.1.2.1 Sample

The number of interviews to be conducted and type of interviewees depend on the purpose of the interview (Cohen et al., 2007). Kvale (2007) provides a simple rule of thumb, “Interview as many subjects as necessary to find out what you need to know” (p. 43). In the present research, fifteen interviews were planned. However, only six interviews were carried out eventually. The sample was a purposive sample because the researcher wanted to ensure the presence of specific demographics within the cases (Cohen et al., 2007). In particular, the sample consisted of males and females, full-time and part-time, and urban as well as rural students. This sample satisfied the researcher’s needs while not meaning to represent the wider population as it was selective. The students were chosen from the survey questionnaires. During that stage, the students were asked to fill some details (their name, email and phone) if they feel willing to be interviewed in the next stage. As it turned out, many students were keen to participate.

4.6.1.3 Interviewing

This stage is concerned with the actual execution of the interview. The interviews were conducted over a period of one week. Bryman and Bell (2007) call attention to the setting where the interview is to be held. The researcher should locate a suitably quiet, private and uninterrupted place and sufficient time for interviewing. Therefore, the researcher tried as much as possible to conduct the interviews in a private and quiet place to minimise any distraction. Unfortunately, there were difficulties over the provision of transportation and finding the best time for everyone. Some interviews took place in the books room in the department where the researcher works at KAU while the central library was the venue for the rest of the interviews.

The interviews started with welcoming and thanking the students for their time. The researcher also introduced herself and explained the purpose of the study and the interview. This involved discussing with the interviewees ethical issues such as consent and confidentiality.

The interviews were recorded and permission to do so was obtained prior to the onset of the interview. To record the interviews, a digital MP3 player with a recording feature was used because it has several advantages over a tape recorder. First, it is too small to be intrusive, thus eliminating any discomfort that might accompany its presence for some participants. Second, it allows an immediate and easy transfer of files to the computer which should be a safer place to store the recorded interviews. Third, having the interviews transferred to the computer, it was very easy to speed up, stop and jot down the minutes where the important words occurred.

However, the recorded interview is a de-contextualised version of the interview, i.e. the visual aspects of the situation is not available (Kvale, 1996). Indeed, as Cohen et al. (2007) argue, it is these non-verbal clues that can provide richer information than the verbal communication. Nonetheless, to capture non-verbal communication by using video-recording might seem threatening and inappropriate in some contexts and it may

result in extensive information that is time-consuming and cumbersome to transcribe (Kvale, 1996). Therefore, the voice recorder was preferred over such a method.

4.6.1.4 Transcribing

Transcribing is an important stage that involves transforming the interview from an oral mode to a written form amenable for analysis. While the interview is dynamic and contextually rich, the transcription is frozen and abstract (Kvale, 1996; Cohen et al., 2007). Therefore, Kvale (1996) notes that the transcribing process is part of the interpreting process because “every transcription from one context to another involves a series of judgments and decisions” (Kvale, 1996, p. 163).

The style of transcribing may vary depending on the intended use of the transcript. For instance, the interview statements can be transcribed verbatim or condensed and summarised. In this research, the purpose was to gain insights from the students’ opinions, which calls for a detailed transcription. However, verbatim transcription that includes pauses, ‘hm’ or repetitions, was felt unnecessary (see Appendix 4C for extracts from the interviews transcriptions).

4.6.1.5 Analysing

This stage refers to generating meaning from the transcribed data or “to separate something into parts or elements” (Kvale, 1996, p. 184). Cohen et al. (2007) suggest some generalised stages in analysing the interview data:

- generating natural units of meaning;
- classifying, categorising and ordering the units of meaning;
- structuring narratives to describe the interview contents;
- interpreting the interview data (p.282).

Kvale (2007) describes several modes of interview analysis as summarised in table 4-3. He categorises these modes of analysis into four general types: modes that focus on meaning, modes that focus on language, bricolage and theoretical reading. In analysing the interview data in this research, the first category was adopted, particularly, meaning condensation mode of analysis as it was deemed most appropriate. In meaning condensation analysis, long statements are condensed into briefer statements in which the core meaning of what is said is rephrased in fewer words (Kvale, 2007).

Table 4-3: Modes of interviews analysis according to Kvale (2007)

<i>Mode of analysis</i>	<i>Definition</i>
Analyses focusing on meaning	Meaning coding “attaching one or more keywords to a text segment in order to permit identification of a statement.” (p. 105) Meaning condensation “entails an abridgement of the meanings expressed by the interviewees into shorter formulations.” (p. 106) Meaning interpretation “goes beyond a structuring of the manifest meanings of what is said to deeper and more critical interpretations of the text.” (p.107)
Analyses focusing on language	Linguistic analysis “addresses the characteristic uses of language in an interview, the use of grammar and linguistic forms.” (p.110) Conversation analysis “investigates the structure and the process of linguistic interaction whereby intersubjective understanding is created and maintained.” (p.111) Discourse analysis “focuses on how truth effects are created within discourses, which are neither true nor false.” (p.112) Deconstruction “involves destructing one understanding of a text and opening it for construction of other understandings.” (p.114)
Bricolage	“a mixed technical discourses where the interpreter moves freely between different analytic techniques.” (p.115)
Theoretical reading	“a researcher may read through his or her interviews again, reflect theoretically on specific themes of interest, write out interpretation and not follow any systematic method or combination of techniques.” (p.117)

4.6.1.6 Verifying

When discussing rigour in qualitative research, writers have traditionally used terms such as establishing ‘truth value’, ‘applicability’, ‘consistency’ and ‘neutrality’ (Guba & Lincoln, 1981; Sandelowski, 1986; Appleton, 1995). Guba and Lincoln (1981) suggest that the ‘truth value’ of a qualitative study should be assessed by its credibility rather than internal validity as in quantitative research methods. Internal validity in quantitative research refers to “the extent to which findings are accurate, match reality and measure it correctly” (Oates, 2006, p. 293). It also refers to issues of instrument validity such as content validity, criterion-related validity and construct validity. In a qualitative research, the determination of credibility can be accomplished “only by taking data and interpretations to the sources from which they were drawn and asking directly whether they believe - find plausible - the results” (Guba & Lincoln, 1981, p. 110). As such, a qualitative research is regarded as credible if it offers faithful descriptions of individuals’ experiences and “that the people having that experience would immediately recognise it from those descriptions or interpretations as their own” (Sandelowski, 1986, p. 30).

To check the credibility of the analysis and to see if the findings reflected the students own perceptions and experiences about the topic addressed in the semi-structured interviews, the researcher asked two interviewees to read the researcher’s analysis and findings.

The second criterion for rigour in qualitative research as suggested by Guba and Lincoln (1981) is applicability. Applicability in qualitative research is related to external validity in quantitative terms. External validity refers to the generalisability of

the research findings to different people, settings or times (Oates, 2006). Guba and Lincoln (1981) argue that the idea of fittingness is more suitable and should be used instead of generalisability when evaluating qualitative research. A qualitative study whose findings fit “contexts outside the current research study situation can be described as having fittingness” (Appleton, 1995, p. 996). Moreover, a study meets the criterion of fittingness when its audience sees its findings as meaningful and applicable in terms of their own experiences (Guba & Lincoln, 1981; Sandelowski, 1986). In order to claim the fittingness of the interview study, the findings from the analysis of the semi-structured interviews should apply to other contexts (Appleton, 1995). This was ascertained through discussions with tertiary students from various higher education institutions in Saudi Arabia and abroad. In fact, the findings seem to be true in other contexts.

The third criterion for rigour in qualitative research is consistency, which is similar to the concept of reliability in quantitative terms. Reliability implies that the scores from an instrument are stable and consistent when the instrument is administered multiple times at different times (Creswell, 2009). In contrast, qualitative research “emphasises the uniqueness of human situations and the importance of experiences that are not necessarily accessible to validation through the sense” (Sandelowski, 1986, p. 33). Guba and Lincoln (1981) suggest the concept of auditability as a measure of consistency in qualitative studies. A study may be judged as auditable or consistent when another researcher can follow the decision trail used by the investigator (Guba & Lincoln, 1981; Appleton, 1995). In other words, another researcher should be able to arrive at comparable but not contradictory conclusions given the data, perspective and situation. As such, the researcher needs to describe the data analysis process clearly, rather than just saying that the findings emerged from the data. In this qualitative phase, the researcher was the data-gathering instrument. Therefore, the reliability of the data elicited is dependent upon the competency of the researcher’s interviewing skills (Appleton, 1995). Steps taken to increasing researcher reliability include conducting one pilot interview to develop interviewing skills and to solve any difficulties that may arise during the interviews. Moreover, since the researcher conducted the interviews alone, problems of inter-interviewer inconsistency in administering the questions were kept to a minimum (Atkins, 1984). Further, recording the interviews provided a check on self-consistency.

Finally, Guba and Lincoln (1981) suggest that the concept of confirmability should be the criterion of neutrality in research. Neutrality “refers to the freedom from bias in the research process and product” (Sandelowski, 1986, p. 33). This is equivalent to the concept of objectivity in quantitative terms. Objectivity in quantitative research refers to the detachment of the researcher from the research process and it is met when reliability and validity are established (Blaikie, 1993). On the other hand, qualitative research values subjectivity rather than objectivity as reflected in “the subjective involvement of investigators with their subjects and the emphasis on the subjective reality or the meanings subjects give to and derive from their life experiences” (Sandelowski, 1986, p. 34). Qualitative researchers view their engagement as a method

of understanding social life (Bogdan & Biklen, 1992). However, they believe that the advantages of such attachment far outweigh its disadvantages (Sandelowski, 1986). Thus, the concept of confirmability proposed by Guba and Lincoln (1981) refers to the findings themselves and not to the subjective or objective stance of the researcher. Guba and Lincoln (1981) argue that, in qualitative research, confirmability that is accomplished by establishing truth value, applicability and auditability should be the standard by which neutrality is judged. In the semi-structured interviews, confirmability was ensured as the three previous criterion suggested by Guba and Lincoln (1981) were met.

4.6.2 ETHICAL CONSIDERATIONS

The interview is a personal interaction that has a moral dimension. As such, there are a number of ethical issues that need to be borne in mind while employing the technique. The issue of obtaining informed consent is important. Moreover, informing the interviewees about the purpose of the investigation as well as any possible benefits or risks that might arise from participation should be also ensured. Further, the right of the interviewee to withdraw at any time should be highlighted (Kvale, 1996). Prior to the start of the interview, all interviewees were provided with a brief account of the research and the purpose for conducting the interview with them. Moreover, they were assured of the voluntary nature of the interview and their right to quit at any time. Further, their permission was sought for recording the interviews (see Appendix 4C for the consent form).

Confidentiality is also another ethical issue that must be ensured. Confidentiality refers to the privacy of the subjects and the information they disclose. In this study, the researcher assured the interviewees that their identities would not be revealed; any excerpts quoted would be anonymous and denote general demographics. In addition, they were assured that no one else would have access to their data which would be discarded once the study is over.

4.7 METHODS AND ISSUES ON QUANTITATIVE DATA ANALYSIS

In answering the research questions, several statistical procedures and analyses were used. This section describes in detail the statistical tests used to analyse the data and answer the research questions. It starts with a brief account of the preliminary steps taken prior to data analysis. It outlines the selected statistical procedures and the rationale for choosing them. The section also deals with the assumptions related to the used statistical tests.

4.7.1 CODING RESPONSES AND SCREENING DATA

Data analysis strategy not only involves choosing the appropriate statistical analysis techniques, but also the initial steps to handle the data such as coding the responses and cleaning the raw data (Pallant, 2007). The coding process started with

defining and labelling each variable. Then the data was entered into a statistical package (SPSS 15). Next, the data was screened to ensure the accuracy of entering scores. This involved locating any score that falls outside the range of possible values for a variable, i.e. looking at the frequencies, minimum and maximum scores, means and modes of all the variables. The subsequent step assessed the dataset for missing data, which is the focus of the next section.

4.7.2 MISSING DATA

Missing data is a frequently occurring problem in many studies. Missing data may occur because of a lack of knowledge of an item by the respondent, a data entry mistake or a respondent's refusal to answer certain items (Litwin, 2003). To avoid occurrences of the first case, the researcher provided an option of 'no opinion'. In addition, careful data screening can help in remedying any entry mistake. However, in the instance of a respondent's refusal to respond to certain items, a thorough analysis of the missing data is necessary. Missing data can critically bias a research's conclusions and limit generalisability (Tabachnick & Fidell, 2007). Therefore, missing data should be addressed and treated. However, prior to treatment, diagnosing the pattern for this is important (Hair, Black, Babin, Anderson, & Tatham, 2006).

In the literature, missing data is classified into three types based on its pattern: missing completely at random (MCAR), missing at random (MAR) and missing not at random (MNAR) (Tabachnick & Fidell, 2007). MCAR is the case in which missingness of the data is completely independent of both the observed and the missing values. MAR is the case in which missingness of the data is independent of the missing measurements, but depends on the observed measurements (Rubin, 1976). When the missing data is neither MCAR nor MAR and the missingness is related to the missing values themselves, then it can be classified as missing not at random (MNAR) (Jamshidian, 2004).

In large samples, randomly missing data of 5% or less poses no threat and can easily be remedied in different ways (Tabachnick & Fidell, 2007). On the other hand, systematically missing data, even of small amounts, can result in misleading findings (Byrne, 2001).

Diagnosing missing data patterns and frequencies can be done easily by using statistical packages such as SPSS. Missing Value Analysis (MVA) is a tool for examining the dataset and uncovering missing data patterns easily. In this study, the Missing Value Analysis procedure incorporated in SPSS v15, was employed to examine the extent and pattern of the missing data. The analysis indicated that the amount of the missing data was less than 3%, rendering it negligible. In addition, to determine if missing data was MAR or MCAR, Little's chi-square statistic provided by SPSS v15 for testing whether data are missing completely at random (MCAR) was employed. In this test, the null hypothesis is that the values are missing completely at random, and the *p* value is significant at the 0.05 level. If the value is less than 0.05, the data is not missing completely at random. The data could be missing at random (MAR) or not

missing at random (NMAR). The result of Little's MCAR test was: $\chi^2=4782.36$, degree of Freedom (df)=5210, $p=1.000$. The null hypothesis of no significant difference was not rejected, i.e. no differences were found between the pattern of missing data on all variables and the pattern expected for a random missing data process. Therefore, the missing data can be classified as MCAR, which allows using various remedies (Tabachnick & Fidell, 2007).

There are different ways to treat missing data. The most common method is listwise deletion in which all cases with missing data are deleted entirely from the data list. Apart from its simplicity, this method may lead to a substantial reduction in the sample size which in turn decreases the statistical power (Arbuckle, 2006). Another way to treat missing data is pairwise deletion. This solution involves removing only the cases with missing values on a particular variable that is required for a particular analysis. Although the sample size does not suffer major reduction, this method leads to different sample sizes for each analysis.

Another method for dealing with missing data is data imputation, i.e. replacing the missing values with estimated values. One type of this approach is mean substitution. Rather than deleting missing values, the mean of a variable is given to the missing values in that variable (Meyers, Gamst, & Guarino, 2006). However, this method does not take into account patterns of scores across all the other variables. In addition, mean substitution may distort the distribution of the data, (i.e. causes a leptokurtic distribution), especially if the volume of incomplete data is large (Pallant, 2007; Byrne, 2001). Another method is regression imputation in which regression equations are used to predict missing values. A disadvantage associated with this method is the inflation of covariances it may cause (Byrne, 2001). Pattern matching is another form of imputation (Kline, 2005). In this method, the missing value is replaced with a value from another case that has a comparable profile of values across the other variables. This method, however, is available only in certain sophisticated statistical software packages (e.g. LISREL) (Jöreskog & Sörbom, 2006).

Another imputation method is that of multiple imputations with the Expectation-Maximisation (EM) algorithm. However, analysis of a data set using this technique can be biased because error is not added to the imputed data set (Tabachnick & Fidell, 2007). A further method is the Full-Information Maximum Likelihood (FIML) method. This method uses "all of the information of the observed data, including mean and variance for the missing portions of a variable, given the observed portion(s) of other variables" (Wothke, 1998, p. 224).

Listwise, pairwise and regression estimation assume that the pattern of missing values is missing completely at random or MCAR, i.e. this missing data does not depend on the data values. Therefore, these methods yield only consistent and unbiased estimates if the data is MCAR. However, if the data is not MCAR, using these methods may give biased estimates. Therefore, a better choice when the data is not MCAR, is to use multiple imputation estimation (Schafer & Olsen, 1998). Multiple imputation

methods assume that the pattern of missing data is connected to the observed data only, i.e. missing at random or MAR.

As mentioned above, the results of the diagnostic tools in this research have shown that the missing data is less than 3% and can be classified as missing completely at random (MCAR). In large samples with such a small amount and pattern of missing data, Tabachnick and Fidell (2007) maintain that no real threat is posed and any method for handling missing data can be equally fruitful. However, given the drawbacks associated with the previously mentioned methods (listwise, pairwise deletion and regression imputation), the EM method for treating missing data was used as it provides estimates that are efficient and consistent (Arbuckle, 2006). This method can be employed easily with SPSS.

4.7.3 CHOOSING THE APPROPRIATE STATISTICS

Choosing the appropriate statistical technique depends on the research questions and the nature of the data (Pallant, 2007). In this study, descriptive and inferential statistics were used. Descriptive statistics are “the numerical, graphical, and tabular techniques for organising, analysing, and presenting data” (Argyrous, 2005, p. 14). The advantage of descriptive statistics is that they reduce a large set of data into more concise and clear forms to read. Examples of descriptive statistics used in this research are frequency distribution, measure of central tendency (such as means, modes), and measures of dispersion (e.g. standard deviation). Inferential statistics refer to “the numerical techniques for making conclusions about a population based on the information obtained from a random sample drawn from that population” (Argyrous, 2005, p. 204). Examples of inferential statistics used in this research include correlation, multiple regression analysis and *t*-test.

4.7.4 ASSUMPTIONS OF STATISTICAL ANALYSES

Statistical tests require specific assumptions in the data to be analysed (Field, 2009). When these assumptions are not met, the conclusions may not be trustworthy, leading to a Type I or Type II error (Osborne & Waters, 2002). As Pedhazur (1997, p. 33) points out, “Knowledge and understanding of the situations when violations of assumptions lead to serious biases, and when they are of little consequence, are essential to meaningful data analysis”. Therefore, screening the data for any violation of these assumptions is an important step to ensure valid conclusions. The next sections discuss the assumptions of two tests used in the study: multiple regression analysis and *ANOVA*.

4.7.4.1 Homoscedasticity

Homoscedasticity is the assumption that the residuals at each level of the predictors should have the same variance (Field, 2009). When the variances are very unequal, heteroscedasticity is present. This can lead to serious distortions of findings and seriously weaken the analysis (Osborne & Waters, 2002). However, Tabachnick and Fidell (2007) indicate that minor heteroscedasticity has slight effect on significance

tests. This assumption can be checked by visual assessment of a plot of the standardised residuals (the errors) by the regression standardised predicted value (Osborne & Waters, 2002). In addition, the assumption can be also tested by inspecting the partial plots produced in SPSS regression analysis. If the dots in these graphs are spread out around the zero-line in a random fashion, this indicates homoscedasticity (Field, 2009). This visual method was used to check this assumption as will be described in the results chapter.

In *ANOVA*, homoscedasticity is commonly referred to as homogeneity of variance (Howell, 2007). It means that the variability of scores of each group is similar. This is examined by Levene's test of equality of variances. However, *ANOVA* is a robust test for the violation of this assumption.

4.7.4.2 Normality

Multiple regression analysis relies on the assumption that the variables have normal distribution (Osborne & Waters, 2002). As such, non-normally distributed variables, i.e. highly skewed or kurtotic, can distort relationships and significance tests (Osborne & Waters, 2002). Normality can be examined graphically or statistically. For example, frequency histograms and P-P plots can help in assessing normality graphically. Examples of statistical measures of normality are skewness and kurtosis scores (Hair et al., 2006). Skewness implies the symmetry of a distribution (Meyers et al., 2006). Kurtosis gives information about the peakedness and flatness of the distribution (Pallant, 2007).

When a distribution is normal, its skewness and kurtosis values are close to zero. In large samples, significant skewness is not very serious unlike its actual size. Therefore, Tabachnick and Fidell (2007) recommend looking at the shape of the distribution instead of only relying on the skewness value. This is also true for the kurtosis measure. Practically, skewness values should be within the range of ± 2 . Values greater than +3 (or less than -3) are assumed to be highly skewed (West, Finch, & Curran, 1995). Some scholars suggest that the value for kurtosis should be also within ± 2 range (Brown, 1997) or ± 3 range (West et al., 1995).

To assess the assumption of normality in this research, all variables were assessed in the data-screening stage by using SPSS v.15 for skewness and kurtosis. Both skewness and kurtosis values were below the ± 3 cut off value recommended in the literature (West et al., 1995) (see Appendix 4D for a table of skewness and kurtosis values of all variables). In general, these results indicate very slight non-normality. However, Pallant (2007) notices that several scales and measures used in social sciences have positive or negative skewness. This does not imply a defect in the scale but rather reveals the underlying nature of the measured construct. Normality for regression analysis was further assessed as will be described in the results chapter by using the scatter plot of residuals against predicted dependent variable scores. Similarly, *ANOVA* assumes that the scores of each variable are normally distributed around their mean. Nonetheless, departure from normality is not usually fatal in *ANOVA* (Howell, 2007).

4.7.4.3 Sample size

Sample size in multiple regression analysis is important for two reasons. First, it has a direct and sizable impact on the statistical power of the regression analysis (Hair et al., 2006). Power in regression analysis means, “the probability of detecting as significant a specific level of R^2 or a regression coefficient at a specified significance level for a specific sample size” (Hair et al., 2006, p. 195). With very large samples, statistical significance can be reached even if the effect is really small. Such a case leads to inflated Type I error. On the other hand, with small samples, even large effect may not be easily detected leading to the risk of committing a Type II error (Tabachnick & Fidell, 2007). Hair et al. (2006) provide a useful table to identify the minimum R^2 that a specific sample size will detect as statically significant at certain α levels with a probability (power) of .80.

Secondly, sample size is important if the findings are to be generalised to the population. Hair et al. (2006) offer a general rule determining the required ratio of observations to the independent variables required to allow generalisation. They suggest a minimum of five observations to each independent variable or, better, 25 observations to each variable. Stevens (2001) suggests a ratio of 15 cases per predictor. When these levels are reached, the results can be generalisable given the sample is representative. In the same way, Tabachnick and Fidell (2007) provide a formula for computing sample size taking into consideration the number of independent variables of interest: $N > 50 + 8m$, where m is the number of independent variables. This rule assumes a medium-size relationship between the independent variables and the dependent variable at $\alpha = 0.05$ and with $\beta = 0.20$. According to this rule, the sample of this study with fifteen variables should be $N=50 + 8(15) =170$. With a sample of 513 respondents, the number of observations is well above the minimum requirement suggested by this rule. In addition, according to the guidelines recommended by Hair et al. (2006) a sample of 531 respondents can detect R^2 values of 5 % at a significance level of .05.

4.7.4.4 Linearity

Linearity refers to the straight-line relationship between two variables. Multiple regression analysis can only give accurate estimates if the relationship between the dependent and independent variables is linear (Osborne & Waters, 2002). Thus, linearity is an important assumption in multiple regression analysis. This assumption can be assessed by examining a scatter plot of residuals (i.e. the difference between the obtained and predicted dependent variable scores) against predicted dependent variable scores.

4.7.4.5 Outliers

An outlier is a case with an unusual extreme value (univariate outlier) or an anomalous combination of scores on two or more variables (multivariate outlier) (Hair et al., 2006). Outliers may occur for different reasons. For example, they may be a result of data entry error that can be easily corrected by checking the minimum and maximum

values of the variable. Moreover, outlier cases may not belong to the intended population. In this case, deleting them is the best solution. Outliers may have been correctly sampled, yet their presence indicates the real distribution of the variable under study. In this case, retaining the outliers is necessary unless they actually distort the statistics (Tabachnick & Fidell, 2007). Therefore, outliers should not be judged as either useful or problematic but rather analysed within the context of the study (Hair et al., 2006). However, because some statistical tests are very sensitive to outliers (e.g. multiple regression), these unusual values should be identified and treated (Pallant, 2007).

A univariate outlier is easily spotted by graphical methods such as box plots and normal probability plots. Statistically, the scores can be converted into z -scores and if any standardised score exceeds ± 2.5 , it is deemed a potential outlier (Tabachnick & Fidell, 2007). However, in larger samples (> 80), the threshold value of standard scores ranges from ± 3 to 4 (Hair et al., 2006). Tabachnick and Fidell (2007) suggest that any score exceeding ± 3.29 is an outlier. In addition, it is important to examine multivariate outliers. These cases can be diagnosed by using Mahalanobis' D^2 measure (Tabachnick & Fidell, 2007). Mahalanobis D^2 is the distance of a case from the centroid of the remaining cases (Tabachnick & Fidell, 2007). This statistic can be obtained from the linear regression analysis command in SPSS. Mahalanobis' D^2 uses a chi-square distribution with degrees of freedom equal to the number of variables involved in the computation and a probability of $p < 0.001$ (Tabachnick & Fidell, 2007). In this section, only the detection and analysis of the univariate outliers are discussed. Multivariate outliers will be discussed in the results chapter when multiple regression results are presented because identifying them includes getting the Mahalanobis D^2 , which is produced with the regression printouts.

In this study, values that occur at outer ranges of the distribution ($\geq \pm 3.29$) were considered outliers. The initial investigation revealed 39 cases with values exceeding ± 3.29 . Once the outlier cases were identified, the second step was to generate profiles on each extreme observation and closely examine the variables responsible for their extreme status (Hair et al., 2006). Potential univariate outliers were found in only eight of the 53 variables in the research. Appendix 4E shows the variables responsible for these cases as well as the outlier case numbers. These cases belonged to different faculties. Moreover, the proportions of their gender and residence were comparable to that of the sample. On examining these outliers more closely, it became clear that they either strongly agree or disagree to the interval scaled statements. Since this research is examining students' perceptions, it is normal to find students with such extreme opinions. Pallant (2007) notes that this may reflect the real distribution of the variable. Consequently, deleting such outlier cases may minimise the findings generalisability (Hair et al., 2006; Tabachnick & Fidell, 2007). Thus, the cases were retained.

4.7.4.6 Multicollinearity and singularity

Multicollinearity refers to the presence of high correlations between variables, i.e. larger than .85. Singularity occurs when one variable is thought to be a combination of

other studied variables (Tabachnick & Fidell, 2007). The disadvantage of such a situation is mainly that it makes finding out the contribution of each independent variable difficult. Specifically, the effects of independent variables are mixed or confounding (Hair et al., 2006). As such, it is recommended to examine the multicollinearity effects in the predictor variables before proceeding to test relationships between the independent and dependent variables.

There are several ways to detect multicollinearity effects including examining correlations between independent variables. These should be less than .80 or .90. In the current analysis, all correlations were less than .80. Moreover, examining tolerance and the Variance Inflation Factor (VIF) values is helpful in detecting multicollinearity (Myers, 1990; Bowerman & O'Connell, 1990). On inspection of the tolerance values and VIF, it was found that the tolerance values were greater than zero and the VIF values were less than 10; therefore, multicollinearity was unlikely to be a problem in this study.

4.7.4.7 Independence of observations

This assumption is an important assumption of *ANOVA*. That is, each measurement must not be influenced by any other measurement (Pallant, 2007). Violations of this assumption can lead to serious consequences (Howell, 2007).

4.7.5 USAGE OF PARAMETRIC AND NON-PARAMETRIC STATISTICS

One of the main assumptions of using statistical tests is the type of data used (Bryman, 2008). There are two types of tests: parametric and non-parametric. Parametric tests are based on the assumption that certain characteristics of the population (from which the sample is drawn) are known. Non-parametric tests, on the other hand, are assumption-free tests, i.e. are not based on assumptions about the sample characteristics (Field, 2009). Due to its accurate and powerful measurement procedures, parametric tests are capable of detecting small differences. In contrast, nonparametric tests are less sensitive and thus may fail to detect differences that might actually exist between groups (Pallant, 2007). Some scholars have argued that parametric tests should only be employed on certain types of data, specifically: interval and ratio data such as temperature and weight. This view stems from the work of Stevens (1946) who introduced a typology of data based on invariance of their meaning under different classes. According to Stevens (1946), the data can take one of these forms: nominal, ordinal, interval or ratio. In addition, Stevens (1951) classified the 'permissible' statistical tests for each type of data. For example, interval or ratio data are the only types that can be tested by parametric procedures.

However, other writers argued against such restrictions (Baker, Hardyck, & Petrinovich, 1966; Borgatta & Bohrnstedt, 1980) and contended that ordinal data should not be excluded from entering the sphere of parametric tests (Yu, 2002) because parametric tests with such data seldom distort the results (Baker et al., 1966). Velleman and Wilkinson (1993) even question the value of categorising the data itself into

nominal, ordinal, interval and ratio, “[t]he use of Stevens’ categories in selecting or recommending statistical analysis methods is inappropriate and can often be wrong. They do not describe the attributes of real data that are essential to good statistical analysis” (p. 2). Lord (1953) argues that parametric tests can be used with ordinal data since tests apply to numbers and not to what the numbers stand for. Yu (2002) points out that it is widespread today for social scientists to utilise composite scores of a Likert-scale data items and treat such ordinal-scale data as a form of pseudo-interval-scaled data. Glass, Peckham and Sanders’ (1972) research with Monte Carlo simulations found that many parametric procedures are not seriously influenced by violation of data type assumptions. In fact, this topic remains one of the unresolved issues in statistics (Bryman & Cramer, 2001). Considering the above argument, in this research, both parametric and non-parametric tests were used where appropriate to analyse the research data.

4.8 SUMMARY

This chapter focused on the methodology employed in this study. The chapter outlined the research design. Specifically, it described the various strategies and research techniques used in the research. It discussed the design, samples, procedures, ethical issues of each phase. It also outlined the advantages and limitations of each technique. In this research, the mixed-method research design was employed to investigate the factors influencing the students’ adoption of e-learning as a supplementary tool and for distance learning. The research design involved a preliminary phase in which an online focus group study was conducted to elicit salient beliefs about e-learning. In the second, quantitative phase of the study, the survey strategy employing questionnaires was used to collect data from a stratified cluster sample of 531 students. The third, qualitative phase employed semi-structured interviews with six students to help explain unexpected quantitative results. The next chapter will describe in greater detail the development and validation of the questionnaire.

5 CHAPTER FIVE THE DEVELOPMENT AND VALIDATION OF THE RESEARCH QUESTIONNAIRE

5.1 INTRODUCTION

Instrument validation is a prior and primary process in the empirical research (Straub, 1989). This chapter discusses the methods used in the development and validation of the research instrument. Issues of research measurement have been stressed and discussed by numerous scholars (Kerlinger, 1973; Churchill, 1979; Carmines & Zeller, 1979; Straub, 1989; Straub et al., 2004). Attention to instrumentation issues has several important advantages. In the first place, as Straub (1989) emphasises, greater attention to instrumentation bring more rigour to the scientific endeavour in general. Attention to instrumentation issues also strengthens research efforts and promotes triangulation in that tested instruments can be utilised by other researchers across heterogeneous contexts and times (Straub, 1989). The rigour in the instrument development and validation is central to establishing greater confidence in the findings. Moreover, Straub (1989) states, “in the process of validating an instrument, the researcher is engaged, in a very real sense, in a reality check. He or she finds out in relatively short order how well conceptualisation of problems and solutions matches with actual experience of practitioners” (p.148). Throughout this process, the steady comparison of theory and practice will lead to more theoretically meaningful variables and variable relationships (Bagozzi, 1980; Straub, 1989). In the end, lack of serious attention to measurement issues may cast doubts on research findings (Straub, 1989).

In developing and validating the research instrument, the paradigm for construct measurement suggested by Churchill (1979) and guidelines recommended by Francis et al. (2004) and Ajzen (2006) were followed. Moreover, the heuristics and guidelines suggested by Straub et al. (2004) to establish validity and reliability were followed.

The development process has two main phases. The initial phase involved an exploratory focus group study to identify variables and generate items for the questionnaire, and this stage was described in the previous chapter. The second phase involved constructing, piloting and refining the questionnaire through a number of iterations which is the topic of this chapter.

5.2 OPERATIONALISATION OF THE RESEARCH CONSTRUCTS

A construct is “an abstract representation of a phenomenon of interest to researchers” (Lewis, Snyder, & Rainer, 1995, p. 204). It can be viewed as a social construction, represented by “a set of intellectually-derived measures that are not self-evident or inherently “true” measures” (Straub et al., 2004, p. 383). As a first step in the

development of the research instrument, the domain of each construct was specified (Churchill, 1979).

For the constructs of attitude, SN, PBC, ISE, PU, PEOU and US, a search of the literature was conducted. In the case of the new constructs, i.e. PF, PI, PA and the normative beliefs, a focus group study was conducted to identify, conceptualise and generate items for these constructs. The operationalisation of all the constructs included in the research model are provided in appendix 5A.

All the constructs, apart from ISE were measured on seven-point scales. This is mainly to obtain enough variability in the answers. This method has been followed in many studies applying TRA, TPB and TAM (Ajzen & Madden, 1986).

As discussed in the previous chapters, TPB (Ajzen, 1985) that forms the research theoretical framework, postulates that behaviour is determined by BI, which is in turn determined by three factors namely, attitude, SN and PBC. For operationalising and measuring these direct constructs, a search of the relevant literature was conducted.

5.2.1 BEHAVIOURAL INTENTION

Following the research of Lee (2001) and Rezaei et al. (2008), BI to adopt e-learning was measured in this study, instead of actual adoption of e-learning. This is because the e-learning system was not yet implemented in the University at the onset of the study. Support for the link between BI and behaviour of different types has been accumulating in the literature (e.g., Ajzen & Fishbein, 1980; Ajzen, 1988; Sheppard et al., 1988; Ajzen, 1991; Godin & Kok, 1996; Armitage & Conner, 2001).

BI is defined as a “person’s motivation in the sense of his or her conscious plan to exert effort to carry out a behaviour” (Francis et al., 2004, p. 32). It is an indication of how hard the person is willing to try, of how much effort he is planning to exert, in order to perform the behaviour (Ajzen, 1991). When behaviours pose no serious problems of control, they can be predicted from intention with considerable accuracy (Ajzen, 1991). In this study, BI has been operationalised to measure *the strength of a student's subjective willingness to adopt e-learning*.

As discussed earlier, e-learning can take two forms: as a learning tool to supplement traditional face-to-face classes or as an entirely on-line distance education method (Lee, 2001). Therefore, following Lee (2001), BI to adopt e-learning was operationalised in this study to cover both usages of e-learning: BI to adopt e-learning as a supplementary tool (BIS) and BI to adopt e-learning for distance education (BID). Five items were used to measure the level of determination to adopt the two usages. Three statements to capture BIS were adopted from Lee (2001). The alpha score for this sub-scale as reported by Lee was high, $\alpha=.913$.

I intend to adopt e-learning to accomplish a learning task whenever it has a feature to help me perform it.

I will try to adopt e-learning on as many occasions as possible.

I intend to increase the use of e-learning in my studies.

Two statements to measure BID were adopted from Ndubisi (2006), $\alpha=0.80$.

Assuming I have access to e-learning, I intend to adopt it for distance learning.

Given that I have access to the e-learning system, I intend to take entirely on-line courses.

The BI measure used a seven-point Likert scale anchored by definitely false = 1 and definitely true = 7.

5.2.2 ATTITUDE

TPB (Ajzen, 1985) postulates that BI can be predicted with high accuracy from attitudes toward the behaviour, SN, and PBC. Attitude as defined by Ajzen (1991) is “the degree to which a person has a favourable or unfavourable evaluation or appraisal of the behaviour in question” (p. 188). Attitude toward adopting e-learning is operationalised in this research as *a student’s overall evaluation of adopting e-learning*. Ajzen (2006) argues that the overall evaluation often has two separate components. One component is instrumental in nature, reflected in adjectives such as valuable, harmful and beneficial. The second component has a more experiential quality represented by adjectives such as pleasant and enjoyable. Ajzen (2006) recommends incorporating both types of adjectives when constructing the scale for capturing attitude. In addition, he also advises using adjectives that capture overall evaluation such as good and bad. To measure attitude, the scale recommended by Ajzen and Fishbein (1980) and adopted by Ngai et al. (2007) for e-learning ($\alpha=0.91$.) was used. It consisted of three statements measured by a seven-point Likert scale anchored by strongly disagree = 1 and strongly agree = 7. The mean of the three items was taken as a measure of attitude, with a high score indicative of more positive attitude towards adopting e-learning. The statements are:

Adopting e-learning will have positive effects on the educational process.

E-learning will provide an attractive learning environment.

Adopting e-learning will be a good idea.

5.2.3 SUBJECTIVE NORM

Subjective Norm or the social influence is another significant predictor of BI as proposed by TPB (Ajzen, 1985). It refers to “the perceived social pressure to perform or not to perform the behaviour” (Ajzen, 1991, p. 188). If an individual believes that the important referents believe that he or she should perform certain behaviour, he or she may choose to perform it even if they do not hold a positive attitude towards the behaviour or its consequences (Ajzen, 1985).

The SN scale measured participants’ perceptions of what significant others thought about them adopting e-learning. In developing the scale for this construct, the

question items were adopted from the work of Ajzen and Fishbein (1980), Taylor and Todd (1995a) ($\alpha=0.95$) and Venkatesh and Davis (2000) ($\alpha=.81-0.94$). This scale had four statements modified to suit the behaviour of adopting e-learning.

People who influence my behaviour would think I should adopt e-learning.

Most of those who are around me would think I should not adopt e-learning.

People who are important to me would think I should not adopt e-learning.

People whom opinions I value would think I should adopt e-learning.

Participants responded to a seven-point Likert scale anchored by strongly disagree = 1 and strongly agree = 7. The mean of the four items was taken as the measure of SN, with a high score indicative of greater sense of influence from some social referents towards adopting e-learning.

5.2.4 PERCEIVED BEHAVIOURAL CONTROL

Ajzen (1985) argues that successful performance of the intended behaviour is contingent on the person's control over the various factors that may prevent it. Thus, he included the construct of PBC in TPB. PBC is defined as "the perceived ease or difficulty of performing the behaviour" (Ajzen, 1991, p. 188). The construct of PBC deals with judgments of how well one can perform the target behaviour (Sheeran, Trafimow, & Armitage, 2003). Following from the definition of PBC presented earlier, perceived control over adopting e-learning was assessed directly using two items adopted from Sheeran et al. (2003) ($\alpha=.77$) with some modifications to suit the research context:

How much control do you have when deciding whether to adopt e-learning for your studies?

Whether I decide to adopt e-learning for my studies is entirely up to me.

Responses to the first item used a seven-point Likert scale anchored by no control = 1 and complete control = 7. Responses to the second item used a seven-point Likert type-scale anchored by strongly disagree = 1 and strongly agree = 7.

5.2.5 INTERNET SELF-EFFICACY

Eastin and LaRose (2000) define ISE as "the belief in one's capabilities to organise and execute courses of internet actions required to produce given attainments". The measure for ISE was based on existing research on ISE and Social Cognitive theory (Bandura, 1997). Several scales exist that assess ISE (Joo et al., 2000; Eastin & LaRose, 2000). Joo et al. (2000) developed a 13-item ISE scale ($\alpha=0.95$) to assess perceived capability to use the internet. Similarly, Eastin and LaRose (2000) developed a shorter eight-item measure of ISE ($\alpha=0.93$). However, a limitation of these scales is that they did not include essential aspects of using the internet such as browsing or using e-mail. In the same way, Eachus and Cassidy (2004) developed a forty-item measure of ISE

($\alpha=0.89$) covering four aspects: information retrieval, information provision, communication and internet technology. Yet, this scale is lengthy covering wide activities related to the internet (such as playing games online, using cascading style sheets). Torkzadeh and Van Dyke (2002) developed a three-factor 17-item instrument for measuring ISE ($\alpha=0.96$) in terms of surfing/browsing, encryption/decryption and system manipulation. However, their scale did not cover important functions such as downloading and uploading files. Moreover, some items were directed towards a very high level of internet usages (e.g. encrypting and decrypting messages). Finally, the scale did not only measure internet capabilities but also tapped other computer skills (e.g. sending fax via computers, scanning pictures). The scale for measuring ISE for this research adopted items from all the previous scales while considering their limitations. The scale consisted of seven items covering the four aspects of ISE as suggested by Cassidy and Eachus (2002). The items are:

Information retrieval:

My confidence in finding information on the World Wide Web using search engines (like Google, Yahoo...) is...

Information provision:

My confidence in downloading and uploading files via the internet is...

Communication:

My confidence in sending and receiving email messages is...

My confidence in participating in web forums is...

Internet Technology:

My confidence in connecting and starting the internet programme is...

My confidence in dealing with email attachment is...

My confidence in installing or setting up an application or software is...

The seven items were measured using a five-point Likert scale anchored as follows: No confidence-low-average-high-very high confidence.

5.2.6 PERCEIVED USEFULNESS

In TAM, PU is defined as “the degree to which a person believes that using a particular system would enhance his or her job performance” (Davis, 1989, p.320). This study defined PU as *the degree to which the students think that adopting e-learning would enhance their learning*. In the original TAM, Davis (1989) used six statements to measure PU ($\alpha=0.98$). Moore and Benbasat (1991) combined the ‘relative advantage’ construct of Rogers’ (2003) innovation attributes with Davis’ PU and developed a nine-item scale ($\alpha=0.90$). To measure perceived e-learning usefulness, the items developed by Lee (2001) and Pituch and Lee (2006) ($\alpha=0.92$) were adopted as they are more pertinent to the educational setting than the scales developed by Davis

(1989) or Moore and Benbasat (1991). This scale had seven items measured on a seven-point Likert scale anchored by strongly disagree = 1 and strongly agree = 7.

Adopting e-learning will allow me to accomplish learning tasks more quickly.

Adopting e-learning will improve my learning performance.

Adopting e-learning will make it easier to learn course content.

Adopting e-learning will increase my learning productivity.

Adopting e-learning will enhance my effectiveness in learning.

I find e-learning useful in my learning.

Adopting e-learning will help me in getting a great amount of information useful for my studies.

5.2.7 PERCEIVED EASE OF USE

In TAM, PEOU refers to “the extent to which a person believes that using a particular system would be free of effort” (Davis, 1989, p.320). Davis (1989) used a six-item scale to measure this construct ($\alpha=0.94$). Moore and Benbasat (1991) used eight items combining the ‘complexity’ construct of Rogers (2003) ($\alpha=0.81$). As the case with the PU construct, the scale for PEOU was also adopted from Lee (2001) and Pituch and Lee (2006) who had successfully adopted TAM to e-learning contexts ($\alpha=0.87$). The scale had four items measured on a seven-point Likert scale anchored by strongly disagree = 1 and strongly agree = 7.

Learning to use e-learning will be easy for me.

My interaction with e-learning will be clear and understandable.

It will be easy for me to become skilful at using e-learning.

Overall, I believe that using e-learning will be easy.

5.2.8 UNIVERSITY SUPPORT

US has been identified as an important factor that influences students’ adoption of e-learning (Cheung & Huang, 2005; Selim, 2007). Cheung and Huang (2005) identified training as a key aspect of organisational support. Selim (2007) added library services, help desk, computer labs and facilities. In this research, the US construct is operationalised following Cheung and Huang (2005) and Selim (2007) as *the support provided by the university to its students to encourage the use of e-learning*. The scale has three items reflecting the following aspects: a desk help for any technical problems, training for using the internet and general support for e-learning. The items were measured on a seven-point Likert scale anchored by strongly disagree = 1 and strongly agree = 7.

A help desk is available when there is a technical problem.

The university provides training for using the internet.

Overall, the use of the internet for our study is well supported in my university.

5.3 NEWLY DEVELOPED CONSTRUCTS

TPB (Ajzen, 1985) proposes that for a deeper understanding of the behaviour, the three determinants of intention: attitude, SN and PBC, can be further decomposed into salient beliefs, i.e. attitudinal, normative and control beliefs (Taylor & Todd, 1995a). “It is at the level of beliefs that we can learn about the unique factors that induce one person to engage in the behaviour of interest and to prompt another to follow a different course of action” (Ajzen, 1991, pp. 206-207). In order to identify these salient beliefs and generate items to measure them, an elicitation study was conducted as described in the previous chapter. The following subsections describe the elicited beliefs, their operationalisation and the items to measure them.

5.3.1 ATTITUDINAL BELIEFS

Davis et al. (1989) indicated that system characteristics have direct effects on users’ beliefs, which in turn, influence attitude and intention to accept and use the system. Similarly, Rogers (2003) postulated that perceptions of an innovation by prospective users influence adoption behaviour. As described in the previous chapter, the on-line focus group study elicited two attitudinal beliefs associated with the adoption of e-learning: perceived e-learning flexibility and perceived e-learning interactivity.

5.3.1.1 Perceived Flexibility

As revealed from the focus-group study, e-learning provides the students with greater flexibility not only in studying at anytime and at any place, but it also facilitates registration (for example, the students can register for a course, modify a section, drop out, defer, etc.). Furthermore, e-learning can save the students time and effort commuting long distances for their lectures. In addition, this flexibility gives the students who have other commitments (e.g. family, job) more control of their time. As such, perceived e-learning flexibility (PF) is defined as *the degree to which the student believes that adopting e-learning will provide flexibility in learning as to time, place and access to the course materials and syllabus*. Four items were generated to measure this construct. They tap the following aspects of flexibility as suggested by the students: studying at any time and place, saving commuting to the university, allowing continuation of study while having other commitments and offering greater control of one’s study. The items were measured on a seven-point Likert scale anchored by strongly disagree = 1 and strongly agree = 7.

Adopting e-learning will offer me flexibility in learning as to time and place.

Adopting e-learning will save me time and effort commuting to the university.

Adopting e-learning will allow me to continue my study while having other commitments.

Adopting e-learning will allow me control over my study.

5.3.1.2 Perceived Interactivity

Powered by the internet, e-learning has several effective synchronous and asynchronous communication tools such as the email, mailing lists and discussion forums that facilitate students' interaction with their tutors, peers and other learners around the world. The focus group study showed that the students perceived e-learning as an interactive tool that allowed better communication with their peers and instructors. Hence, the construct of perceived e-learning interactivity (PI) in this study can be defined as *the degree to which the student believes that the adoption of e-learning will enable interactive communication between students, their instructors and among students themselves*. To measure this construct, three items were devised and measured on a seven point Likert scale anchored by strongly disagree = 1 and strongly agree = 7.

Adopting e-learning will enable interactive communication between the instructors and students.

The tools used in e-learning (such as the email, discussion forums and bulletin boards) are effective ways of communication.

Adopting e-learning will enable interactive communication among the students.

5.3.2 NORMATIVE BELIEFS

Todd and Taylor (1995a) and Ndubisi (2006) investigated the acceptance and use of technology by samples of students. They identified instructors and peers as the important referents for the students population. Likewise, based on the elicitation study described in the previous chapter, this study incorporates the influence of both groups in the model and adds the influence of family. Thus, normative beliefs can be defined as *the pressure the students feel from instructors, other students, or key others in their environment such as family members to adopt e-learning* (Shen, Laffey, Lin, & Huang, 2006).

For measuring the indirect SN construct, three statements were formulated to assess the strength of normative beliefs with respect to each reference group, namely, peers, instructors and family. In addition, three statements were also formulated to assess motivation to comply with pressure from each reference group. Motivation to comply is *the extent to which a person wishes to comply with the desires of the referent* (Ajzen & Fishbein, 1980).

This scale was developed and scored following the guidelines of Ajzen (2006). To obtain an estimate of the indirect SN, each normative belief (nb_i) is first multiplied by the motivation to comply with each referent (mc_i). Then, the cross products are summed for all salient referents to determine the SN ($\sum nb_i mc_i$). The indirect SN scale has thus six items. Respondents were asked to rate the extent to which they thought their important

referents encouraged them to adopt e-learning, using a 7-point scale (extremely unlikely – extremely likely). In addition, participants were asked to indicate their motivation to comply with each referent on a 7-point scale (1 = not at all, 7 = very much).

Normative beliefs

My friends encourage me to adopt e-learning.

My instructors encourage me to adopt e-learning.

My family approves that I adopt e-learning.

Motivations to comply

I will take my friends' advice on adopting e-learning.

I will take my instructors' advice on adopting e-learning.

I will take my family view on adopting e-learning.

5.3.3 CONTROL BELIEFS

5.3.3.1 Perceived Accessibility

Perceived e-learning accessibility is defined as *the degree to which e-learning is perceived as accessible to the students*. In particular, the focus group study revealed that this construct involves issues of cost, internet connection and internet speed. The scale for this construct has five items revolving around the abovementioned aspects. The items were measured on a seven-point Likert scale anchored by strongly disagree = 1 and strongly agree = 7.

The cost of connecting to the internet is affordable.

I have an easy access to the internet at my home.

I have an easy access to the internet in the university.

I find the speed of using the internet is excellent.

I do not face any technical problems while using the internet.

5.4 DEMOGRAPHICS

Previous literature suggests that individual factors are important in IT acceptance (Agarwal & Prasad, 1999; Yi et al., 2005-2006). Earlier studies have investigated a range of individual characteristics including gender (Gefen & Straub, 1997; Venkatesh & Davis, 2000; Ong & Lai, 2006), mode of study, i.e. part-time or full-time (Wagner et al., 2005), place of residence, i.e. urban and rural (McLean & Morrison, 2000; Ibrahim, Silong & Abu Samah, 2002). The third part of the questionnaire was designed to elicit information related to the students' gender, mode of study, place of residence, faculty, family and job responsibilities, type of internet connection and internet experience. The questions were framed carefully to minimise confusion and all the answers were closed-ended.

5.4.1 MODE OF STUDY

Mode of study is defined as *the type of registration with the University for obtaining a bachelor degree*. There are two modes for obtaining a bachelor degree at King Abdul Aziz University, namely, regular which is similar to full-time and intisab which resembles the part-time mode in the UK.

5.4.2 PLACE OF RESIDENCE

Place of residence was defined as *the place where the student resides originally not only during term time*. King Abdul Aziz University is located in the city of Jeddah which is surrounded by many villages and towns ranging in distance from Dahban (9 miles) to Rabigh (186 miles). Some students live in distant villages and towns while residing in a university dormitory during term time. Thus, in eliciting information on “*Where do you live?*”, two choices were given: Jeddah, or outside Jeddah. A note was provided to clarify the point that the students who are not from Jeddah but live during term time in the dormitory, a rented house or with relatives and friends, should indicate that they are from outside Jeddah regardless of their stay in Jeddah during term time. A student is considered urban if he originates from Jeddah and rural if he originates from outside the city.

5.4.3 FACULTY

The question concerning the students’ major or faculty provided six options: the Faculty of Arts and Humanities, the Faculty of Sciences, the School of Medicine and Medical Sciences, the Faculty of Computer Sciences and Informatics, the School of Administration and Economics, and the Faculty of Home Economics.

5.4.4 JOB AND FAMILY RESPONSIBILITY

The questions aimed at soliciting information regarding whether the student has any family responsibility and/or job commitment were as follows:

Do you have any family responsibilities (such as caring for parents or children)?

Do you have any job responsibility (part-time or full-time, voluntary or for living)?

The answers to both questions are dichotomous yes/ no answers.

5.4.5 TYPE OF INTERNET CONNECTION

This question was framed as follows:

What type of internet connection do you have?

The answers given were based on those solicited from the online focus group study. The types of internet connection available for the students in this particular

context include dial-up, DSL, wireless and satellite. The option of no internet connection was also provided.

5.4.6 INTERNET EXPERIENCE

Internet Experience was defined in this study as *the duration and frequency of using the internet regardless of purpose of usage*. The scale has two items adopted from previous studies (Lee, 2001; Tsai et al., 2001; Liaw, 2002a). The first item asks about the duration of using the internet and invites seven responses anchored as follows:

Never used - Less than 1 year - A year - Two years - 3 to 4 years - 5 to 6 years - More than 7 years

The second question asks about the frequency of using the internet and the responses were anchored as follows:

No use - Rarely - Once a month - Several times a month - Once a week - Several times a week – daily

5.5 TRANSLATION OF THE INSTRUMENT

As the respondents were native Arabic speakers, the instrument was translated into Arabic. Translation involves not only linguistic issues but also theoretical considerations and matters of generalisability (Francis et al., 2004). Lateral translation of the items originally developed in English may not be valid as sound Arabic statements.

Francis et al. (2004) suggest some broad principles when translating questionnaires developed to measure the constructs of TPB. They argue that the most important principle is that translation should be carried out by persons who are native speakers of the target language, i.e. the language to which the questionnaire is being translated. Moreover, the translated questionnaire should be then subjected to a validation process by employing the back translation method (i.e. translating back the instrument into the original language to establish equivalence with the original version) (Francis et al., 2004). As such, the questionnaire items were translated from English into Arabic by the researcher who is a native speaker of Arabic and another Arab PhD student with expertise in Arabic-English translation.

Moreover, in translating the items associated with the constructs of TAM, the Arabic version of the instrument translated by Lowry (2004) was used. Lowry (2004) translated and validated the instrument. Specifically, in his study, construct validity of the questionnaire was assessed through factor analysis using principal components analysis. Internal reliability was assessed using Cronbach's alpha. He reported high psychometric properties ($\alpha=0.84$) for the Arabic version.

Next, the initial Arabic draft was given to a native Arab PhD student majoring in applied linguistics to translate some items back into English. Back-translation ensures

that the original and back-translated versions of questionnaire are equivalent in meaning (Fife-Schaw, 2006). Subsequently, the two English versions were compared in order to identify any terms or words of dispute. The researcher reviewed the two versions and accordingly modified the Arabic version. An Arabic language teacher reviewed the modified Arabic version. Based on her comments, some changes to the wordings of some statements were made.

Table 5-1 presents the statements and the suggested amendments. The modifications included changing the internet-self-efficacy scale items by replacing the prepositional phrases with noun phrases. In addition, the statements in the scales of perceived e-learning usefulness, ease of use, flexibility and interactivity were also changed from noun phrases into verbal phrases. The most problematic items were those related with the SN measure. After some rewording, the final items were agreed upon by the researcher and the Arabic language teacher.

Table 5-1: Statements needed rewording in the Arabic instrument

<i>Statements</i>	<i>Suggested correction</i>	<i>Type of modification</i>
لدي القدرة على ايجاد معلومات على الانترنت باستخدام محركات البحث مثل جوجل	قدرتي على ايجاد	Change prepositional phrases into noun phrases.
ان التعليم الالكتروني سيمكنني من انجاز مهماتي الدراسية بشكل اسرع	سيمكنني التعليم الالكتروني من انجاز مهماتي الدراسية بشكل اسرع	Change noun phrases into verbal phrases.
معظم الناس المهمين لي يعتقدون انه ينبغي لي ان استخدم الانترنت في دراستي الجامعية	معظم من يهمني من الناس يرون انه ينبغي لي أن استخدم الانترنت في دراستي الجامعية	Change the noun and the relative phrase attached to it.

5.6 VALIDATION OF THE INSTRUMENT

Instrument validation as Straub (1989, p. 8) argues is both a “prior and primary” step in any empirical research. In other words, “if validation of one’s instrumentation is not present... then all other scientific conclusions are thrown into doubt” (Straub et al. , 2004). The goal of the validation process is to give the research community a high degree of confidence that the methods used are useful in the quest for scientific truth (Nunnally, 1978).

The research conceptual model is comprised of a number of constructs that are well-established in the literature. Straub et al. (2004) suggest that if a previously validated measurement is available, for efficiency purposes, it is preferable to adopt this rather than design a new one. Therefore, the instrument has adopted previously developed and validated measurements for the well-established constructs but developed from scratches ones for the new constructs. Nevertheless, if significant changes have been made in the adopted measurement, it is critical to re-validate it (Straub et al., 2004).

The following sections will discuss how the research instrument was validated by applying content, construct and reliability tests. Content validity is discussed first as it is concerned with the representativeness of the items to the construct domain (Kerlinger, 1973; Carmines & Zeller, 1979).

5.6.1 CONTENT VALIDITY

Since some of the research measures were developed or modified to suit the study purposes, there was a need to ensure that these items had content validity (Churchill, 1979). Content validity is an essential first step in the measurement process (Rubio, 2005). The essence of content validity is that items of an instrument should be relevant and representative of the intended construct for a particular purpose (Ding & Hershberger, 2002).

Psychometricians and researchers point out that content validity is a valuable tool, albeit complex to assess (Straub et al., 2004). It can be established through literature reviews, expert judges and empirical assessment (Ding & Hershberger, 2002; Straub et al., 2004). Moreover, there are two types of content validity: face validity and logical validity (Rubio, 2005). Face validity is the less rigorous type as it simply involves revision of the measure by some experts. Logical validity is more methodical as it entails revision of the measure based on specific criteria (Rubio, 2005).

Content validity in this study was established by a panel of judges or experts. Although this process is subjective in nature as it relies on human perceptions, it can be objectified with a rigorous content validity study that includes calculating indices (Rubio, 2005). The purposes of content validate the questionnaire items was primarily to assess how representative of the content domain these items are and how clear they are. What follows is the description of the content validity process.

5.6.1.1 Selecting the experts panel

The choice of the panel of experts should be based on criteria such as qualifications, publications, experience, etc. (Rubio, 2005). The panel should also include content experts as well as lay experts (Rubio, Berg-Weger, Tebb, Lee, & Rauch, 2003). The content experts are professionals who have worked in the field or have publications on the topic (Rubio et al., 2003). The lay experts are individuals for whom the research topic is most familiar. The literature does not prescribe the number of experts needed. Rubio et al. (2003) suggested a minimum of three. Yet some authors have recommended a range from two to 20 (Gable & Wolf, 1993). However, Lynn (1986) states that such a decision can be based on how many persons the instrument developer can identify; yet it should not be less than three. Accordingly, four experts were selected to assess the content validity of this instrument. Two of them were content experts: a professor of educational technology at an Egyptian Arab university and the other is a professor of educational technology at a Saudi university. The lay experts included two PhD candidates in Information Systems Management and Informatics at a British university.

5.6.1.2 Method

After selecting the panel of experts, an e-mail soliciting their participation was sent. Upon acceptance, a packet, including a cover letter, questionnaire items and response form, was then sent (see appendix 5B). The cover letter explained the purpose of research, the reason the expert was chosen, the instrument and its scoring scheme and description of the response form. To ensure clarity and that all experts had a consistent view, definitions of research constructs were also provided.

Following the steps suggested by Rubio et al. (2003) and Rubio (2005), the experts were asked to judge each item based on representativeness and clarity on a scale ranging from 1 to 4, with 1 meaning not representative or not clear and 4 meaning representative or very clear (table 5-2). Representativeness is the degree to which items are representative of a construct conceptual definition (Hardestya & Beardenb, 2004). Clarity of an item refers to the item's wording. Moreover, the experts were requested to provide comments that explained their ratings and items that should be added to or deleted from the instrument. Three emails were sent as reminders to complete and return the forms. The four experts managed to return their comments within a two week period.

Table 5-2: The criteria used for measuring content validity

<i>Representativeness</i>	<i>Clarity</i>
1 = Not representative	1 = Not clear
2 = Needs major revisions to be representative	2 = Item need some revision
3 = Needs minor revisions to be representative	3 = Clear but need minor revision
4= Representative	4 = Very clear

5.6.1.3 Analysis

Once the response forms were returned, two types of data analyses were performed to assess content validity: interrater agreement (IRA) and content validity index (CVI) (Rubio, 2005) (see Appendix 5C for the complete content validity data of the instrument).

5.6.1.3.1 Interrater Agreement (IRA)

The first analysis that was conducted to determine the content validity of the research measurement was InterRater Agreement (IRA). IRA assesses expert ratings consistency. It was computed by firstly converting the four values of the representative and clarity scales to dichotomous values, i.e. values 1 and 2 became 1 whereas 3 and 4 became 2. After that, the number of experts who rated the item the same was divided by the total number of experts as shown in the following equation:

$$\text{Item IRA} = \frac{\text{Number of experts who rated the item the same}}{\text{Total number of experts}}$$

Interrater reliability for the whole measure was computed by dividing the number of items that had 100% agreement by the total number of items as shown in the following equation:

$$\text{Scale IRA} = \frac{\text{Number of items with 100\% agreement}}{\text{Total number of items}}$$

The rule was that any score below 0.75, which indicates the agreement of three of the four experts, would be regarded as lack of agreement among the experts and the item with this score would be reviewed (Rubio, 2005). This analysis was conducted for both representativeness and clarity scales.

5.6.1.3.2 Content Validity Index (CVI)

The second analysis was the Content Validity Index (CVI), which determines the measure representativeness and clarity. The CVI for each item was computed by counting the number of experts who rated the item as 3 or 4, and dividing the resulting number by the total number of experts as in the below equation:

$$\text{Item CVI} = \frac{\text{Numbers of experts who rated the item as 3 or 4}}{\text{Total number of experts}}$$

The CVI for the whole measure was determined by calculating the average CVI of the individual items (Rubio, 2005).

$$\text{Scale CVI} = \text{Average CVI of the individual items}$$

As with interrater reliability, any score below 0.75, which would mean that three experts rated the item 3 or 4, would be regarded as a low CVI and the item would be revised (Rubio, 2005). All CVI were computed for both representativeness and clarity scales.

5.6.1.4 Interpreting the results and revising the instrument

The results of the study (Appendix 5C) showed that most of the individual items had an interrater reliability of 1.0 (100%) for clarity. However, six items (1, 3, 4, 5, 10, and 40) had an interrater reliability below 0.75 which is the minimum level of acceptance (Rubio, 2005). The six items were brought up during further communications with the experts. Again, the items measuring the SN construct were brought up at this stage, indicating they were still ambiguous and unclear. Two experts commented on the ambiguity of the phrase ‘who are around me’ in item number 10 ‘*most of those people who are around me would think I should adopt e-learning*’. This item measures SN and is meant to assess the influence of any important individuals to the students in general. Thus, the phrase ‘those people who are around me’ is suggested to tap this construct. As such, it was left intact. The other items (1, 3, 4, 5, and 40) were reworded as suggested by the experts (see appendix 5C). Specifically, the word ‘technical’ was added to item 40 to indicate technical problems. Items 1 and 3 were reworded to explain ‘supplementary tool’ more clearly by adding the phrase ‘while attending lectures’. Similarly, the phrase ‘totally online’ was added to items 4 and 5.

For the whole clarity scale an interrater reliability of 0.89 was achieved which is acceptable (Polit & Beck, 2004). As for the interrater agreement regarding the representativeness scale, the results show an interrater reliability of 1.0 (100%) for each individual item. For the scale as a whole, the interrater reliability was also 1.0 (100%). These scores indicate consistency among the experts in their rating of the items and the scale.

The content validity index (CVI) for the individual items of the clarity scale, showed that the majority of the items were clear, apart from nine items (1, 3, 4, 5, 9, 10, 11, 12, 36) which scored lower than the 0.75 cut-off point. Items 9, 10 and 11 were proposed to measure the influence of society on the students' decisions to adopt e-learning (SN). The vagueness in the phrases used (e.g. people whose opinions I value, people around me, important people to me) were all meant to tap the influence of other people on the students in general. When discussing this with the experts, only one of them suggested rewording one item. As a result, the word 'most' was added to clarify item 11. Moreover, item 36 was reworded as suggested by one expert to include examples of internet communication tools such as e-mail and web-forums. As for items 1, 3, 4 and 5, two experts suggested clarifying the meaning of the terms 'supplementary tool' and 'complete mode of delivery'. As such, the statements were reworded as recommended. Despite the low CVI obtained for the nine items, the CVI for the clarity scale as a whole, was 0.86 which is acceptable (Polit & Beck, 2004). The CVI for each item in the representative scale, as well as the scale as a whole, was 1.0 (100%) which indicates consistency among the experts in the rating of the items (see Appendix 5C).

Further, regarding the instructions to the participants, the interrater agreement (IRA) and content validity index (CVI) achieved 1.0 (100%) indicating that all four experts agreed in their ratings and the instructions were clear. Finally, concerning the addition or deletion of any item, one expert suggested the addition of an item investigating the students' ownership of a personal computer because the availability of a computer is a prerequisite for accessing the internet. As a result, a new item was added to the accessibility scale to tap personal computer ownership with a dichotomous response of yes or no. It should be noted that the content validity study was done on the Arabic version of the instrument.

5.6.1.5 Limitations

There were some limitations to the content validity study. Firstly, as e-learning is a recent innovation, it was not an easy task to locate experts. However, it was possible to reach two experts in two distant places with the help of one of e-learning's tools, i.e. email. Moreover, the second limitation is that content validity is a subjective process (Straub et al., 2004). That is, it relies on feedback obtained from experts. Therefore, the study is susceptible to bias that may exist among the experts. As such, this study did not eliminate the need to examine additional psychometric properties. However, although content validity is subjective, the utilisation of the abovementioned procedures as suggested by Rubio et al. (2003) and Rubio (2005) added objectivity. Finally, a further limitation is that in such a content validity study, there is no clear way to discover other

content that might have been absent from the measure. Nevertheless, asking the experts for any additional items helped to reduce this weakness. Content validity is an important step in evaluating a measure; however, it is not a sufficient indication that the instrument actually measures what it intends to measure. Thus, another step was taken to ensure that the sample has the appropriate level to respond appropriately to the research instrument.

5.7 PILOTING THE INSTRUMENT

5.7.1 INITIAL PILOTING

Once the content validity of the questionnaire items was established, the instrument became ready for the piloting stage that aimed mainly at establishing its reliability and construct validity. Although the content validity study employed the opinions of experts, it is equally important to take the opinions of a similar sample to the intended research sample (Van Teijlingen & Hundley, 2001). The rationale for this pre-piloting stage is to ensure that the research instrument is clear and comprehensible for the study sample, in this case, the undergraduate students. The advantages of such a stage include:

- To find out any ambiguity in the wording;
- to catch typos and errors;
- to determine how long it takes to fill out the questionnaire;
- to check the layout of the questionnaire and
- to check the suitability of the font size.

5.7.1.1 Method

A pre-pilot test of the instrument was undertaken to check these issues. Five students were selected through a convenient sampling method. These participants were not included in the actual study. They were asked to give feedback on the following issues: the length of time needed to complete the instrument, the clarity of the statements and instructions, typographical errors and the layout/structure of the instrument (see Appendix 5D). Once each student had completed the questionnaire, the researcher discussed with him/her any difficulty or suggestions.

5.7.1.2 Feedback

Some useful feedback was gained from this pre-piloting round. Firstly, two students commented on the font size and suggested enlarging it as they themselves found difficulty reading it. Accordingly, the font size was changed from 12 points to 14 points. Secondly, one student suggested separating the questionnaire from the answer sheet as this would speed up the process of marking the chosen answer. However, the researcher decided not to adopt the suggestion lest it might increase mistakes or

encourage thoughtless responses. Further, a minor change was made to the questionnaire wording of the cover letter. However, no comments were suggested regarding the comprehensibility of the statements and instructions. In addition, the completion time for the pilot instrument ranged from 7 to 15 minutes, which was deemed tolerable. Finally, the suggestions made by participants were incorporated and a final version of the instrument was ready to be piloted on a larger scale.

5.7.2 MAIN PILOT STUDY

A pilot study is essential in the planning and carrying out of research (Connelly, 2008). A pilot study refers to “mini versions of a full-scale study, as well as the specific pre-testing of a particular research instrument such as a questionnaire or interview schedule” (Van Teijlingen & Hundley, 2001, p. 1). However, it is not simply a small exploratory investigation, for it used to guide the main study (Connelly, 2008). Therefore, Connelly (2008) argues that it is unethical to conduct a research involving a large number of participants that proves to be inconclusive because of difficulties that could have been detected with a well-planned pilot study. In general, a pilot study uses parallel methods and procedures to the main study (Cohen et al., 2007). The pilot study serves many purposes. Among these as pointed out by Van Teijlingen and Hundley (2001) and Cohen et al. (2007) are:

- checking the clarity of the questionnaire items and instructions;
- getting feedback on the validity and reliability of the questionnaire items;
- checking the length and complexity of the questionnaire;
- trying out the coding and analysis of the data;
- assessing the likely success of proposed recruitment approaches;
- identifying logistical problems which might occur using the proposed methods;
- collecting preliminary data; and
- assessing the proposed data analysis techniques to uncover potential problems.

Therefore, a pilot study was conducted as a prelude to the main study. The data generated from this study was used to establish construct validity as well as internal reliability. Moreover, it was also aimed at testing administration procedures so as to deal with any difficulty that may arise later.

5.7.2.1 Sample size

In deciding on the number of participants for this stage, it was decided to choose a sample size that would allow the use of factor analysis. Factor analysis is a statistical method used to testify the construct validity (Straub et al., 2004). A successful factor analysis needs at least 100 participants (Brace, Kemp, & Snelgar, 2006). The rule of

thumb is that there should be more participants than variables (Kline, 1994). Kline (1994) recommends a minimum ratio of 2:1. In general, authors agree that the more participants, the better. There were 47 variables to be factor analysed and by applying Kline's rule, at least 94 participants should be surveyed. However, the researcher decided to use a sample of 150 students to obtain better result. In selecting the sample for this piloting round, a random stratified clustering sampling method was used.

5.7.2.2 Method

It was initially essential to seek official permission to enter the premises of the University where the study will take place and distribute the questionnaires. Permission was obtained from the Deanship of Scientific Research at King Abdul Aziz University. Before granting permission, the dean and another member of the research council reviewed the questionnaire, paying particular attention to the content and wording. No changes were made to the questionnaire. This unplanned revision was a further check to the instrument's face validity. Before the distribution of the questionnaires, ethical issues were ensured. The researcher described the aims of the research and the goal at this stage. The students were told of their right to withdraw at any time and that their participation would be confidential as nobody other than the researcher would see the data.

5.7.2.3 Participants profile

As the questionnaire was distributed during class times, there was no non-response problem. However, some of the questionnaires collected had some unintelligible answers or several questions left blank. Of the 150 questionnaire, 132 were usable. Table 5-3 shows a summary of the profile of the students who responded to the pilot questionnaire.

Table 5-3: Profile of pilot study participants

	<i>Frequency</i>	<i>Percent</i>
Gender		
Male	29	21.2
Female	103	78.6
Total	132	
Mode of study		
Full-time	128	97.0
Part-time	4	2.3
Total	132	
Place of residence		
Jeddah	105	79.5
Outside	27	19.7
Total	132	
Faculty		
Arts and Humanities	82	62.1
Science	8	6.1
Administration and Economics	30	22.7
Engineering	7	5.3
Medicine	5	3.8
Total	132	

The following sections describe the results of the pilot study conducted to establish the reliability and construct validity of the research instrument.

5.7.2.4 Reliability

Reliability implies consistency. The reliability of a measurement is “the extent to which it yields consistent results over repeated observations” (Eagly & Chaiken, 1993, p. 67). This concept is important because if the scale of a piece of research is not reliable, the research will not yield useful information (Graziano & Raulin, 2007). Reliability has two aspects: temporal and internal. Temporal reliability or the test-retest reliability is the degree to which scores of a test are consistent over time when administered to the same sample (Oppenheim, 2000). However, this procedure can introduce a problem known as the retesting effect. Alternate-form reliability is another way to assess the reliability of an instrument. This method involves using differently worded items to measure the same attributes (Litwin, 2003).

Another method to check reliability is to assess the internal reliability of the measure. Internal reliability refers to the extent to which a measure is consistent within itself (Hammond, 2006). One way of testing internal reliability is the split-half method which is determined by establishing the relationship between the scores of two equivalent halves of a test administered to a group at one time, thus eliminating the effect of retesting (Coolican, 2006). Yet this method only uses some of the available correlations among the items.

A better method to assess internal consistency whilst taking account of all the correlations among the items on the scale is Cronbach’s coefficient (Cronbach, 1951) symbolised as alpha (α) (Stangor, 2007). This procedure is an assessment of the average correlation between all the items of the scale and it numerically equals the mean of all possible split-half reliabilities. Eagly and Chaiken (1993) explain,

alpha is the current standard statistic for assessing the reliability of a scale composed of multiple items. ... It is the most appropriate reliability measure to use for Likert and semantic differential scales because these methods assume that the items are parallel sample measures of the same attitude content domain (p. 67).

Cronbach’s alpha coefficient ranges from 0 to 1.0 and high scores above 0.70 suggest that the measurement is reliable (Nunnally, 1978). Hinton, Brownlow, and McMurray (2004) proposed four cut-off points for describing reliability scores: 0.90 and above implies excellent reliabilities, 0.70–0.90 implies high reliability, 0.50–0.70 implies moderate reliability, 0.50 and below implies low reliability.

In this study, the alpha scores for all the sub-scales are presented in table 5-4 below. Four sub-scales (BID, ISE, PU and PEOU) had α of 0.90 or above which indicate excellent reliability according to Hinton et al. (2004). The remaining sub-scales had alpha values of 0.80 which is also regarded as high (Hinton et al., 2004). However,

PA and SN had the lowest alpha scores ($\alpha = 0.669$ and 0.700 respectively). Nevertheless, according to Hinton et al. (2004), these show moderate reliability. The overall instrument reliability of 0.869 indicates a scale of high reliability (table 5-4).

Table 5-4: Reliability of the whole scale and subscales

<i>Scale</i>	<i>α</i>
BIS	.807
BID	.901
AT	.831
SN	.700
PBC	.812
ISE	.903
PU	.915
PEOU	.922
US	.864
PF	.840
PI	.869
PA	.669
Whole scale	.869

Reliability is an essential criterion of a robust measure, yet it is not sufficient in itself (Sapsford, 2006). A measure that is reliable but does not measure the right thing is certainly unhelpful. Therefore, it was important to assess the validity of the scale by determining the extent to which a scale measures what it purports to. Thus, validity is a major requirement of measurement and is discussed next.

5.7.2.5 Validity

In addition to establishing the reliability of an instrument, assessing its validity is important. Validity implies the issue of whether a scale measures what it is intended to measure (Coolican, 2006). Validity is judged on the aims, sample and context of the study. The concept is, hence, situation-specific (Gay et al., 2006). In other words, a test can be valid for a particular purpose and a particular group and at the same time invalid for another purpose and a different group.

There are several types of validity: face, content, construct and criterion-related. Face validity means the extent to which an instrument appears to measure what it intends to measure (Gay et al., 2006). Examining face validity may simply involve showing the instrument to some non-expert or untrained individuals to check the appropriateness of its content (Litwin, 2003). Another very close concept, yet more rigorous, is content validity.

Content validity is a subjective measure of “how appropriate items or scales seem to a set of reviewers who have some knowledge of the subject matter” (Litwin, 2003, p. 33). The evaluation of content validity as described earlier in this research usually involves a planned and organised review of the instrument’s contents to check that it takes account of everything it should include. Face and content validity can be used in the initial stages of instrument development, yet they are subjective and limited measures. Thus, there is a need for other methods for assessing the instrument based on data (Stangor, 2007).

Criterion validity is one type of validity that employs a criterion to assess the soundness of the measurement. It has two forms: concurrent and predictive validity. Concurrent validity is the degree to which scores on a scale are related to scores on another criterion (e.g. test) that captures the same concept (Pole & Lambard, 2002). Predictive validity is similar, yet the criterion test is administered on a later occasion (Pole & Lambard, 2002).

Construct validity is another form of validity. It refers to “the extent to which a measured variable actually measures the conceptual variable (the construct) that it is designed to assess” (Stangor, 2007, p. 92). Convergent validity and discriminant validity are two forms of construct validity. Convergent validity refers to “the extent to which the measured variable is found to be related to other measured variables designed to measure the same conceptual variable” (Stangor, 2007, p. 93). Unidimensionality is an aspect of convergent validity and implies that the test measures a single trait or characteristic (Sapsford, 2006). Discriminant validity refers to the degree to which the construct is not similar to another construct with which it should not be similar in theory (Fink & Kosecoff, 2005).

Construct validity can be assessed in various ways including factor analysis (Straub, 1989), the Multitrait-Multimethod Matrix (Campbell & Fiske, 1959) or by calculating the AVE (average variance extracted) which measures the amount of variance captured by a construct in relation to the variance due to random measurement error (Fornell & Larcker, 1981). In this research, construct validity has been established by using exploratory factor analysis. The following section illustrates how construct validity was established for the initial instrument.

5.7.2.5.1 Construct validity

Construct validity is “an issue of operationalisation or measurement between constructs” (Straub et al., 2004, p. 15). One method of assessing construct validity is by establishing the factorial validity of the constructs (Bagozzi, 1980). Factorial validity examines both convergent and discriminant validity by using factor analytic techniques such as exploratory factor analysis and confirmatory factor analysis (Straub et al., 2004). Principally, convergent and discriminant validity are established by assessing the factor loadings, resulting from a factor analysis, to check that the items or indicators load cleanly (converge together) on constructs (factors) on which they are theorised to load and at the same time do not cross-load on constructs on which they should not load

(diverge or discriminate between factors). To assess the construct validity (convergent and discriminant validity), factor analysis was used.

Factor analysis

Factor analysis refers to a class of multivariate statistical methods “whose primary purpose is to define the underlying structure among the variables in the analysis” (Hair et al., 2006, p. 104). In a general sense, factor analysis is used to analyse the structure of the interrelationships (correlations) among a large set of variables or items (e.g. questionnaire responses, test scores) by identifying a set of common underlying dimensions, known as factors (Straub, 1989; Hair et al., 2006). A factor is essentially, an “undimensional construct or dimension within a data set which is characterised by the variables of which it is comprised” (Watson, 1998, p. 1361). By using factor analysis, the researcher can initially determine the separate dimensions of the structure and then describe the degree to which each variable is explained by each dimension (Hair et al., 2006).

There are two major forms of factor analysis: exploratory and confirmatory. An exploratory factor analysis aims at describing relationships between variables without determining the extent to which the outcomes fit a particular model (Bryman & Cramer, 2001). Exploratory factor analysis is usually performed in the early stages of research. Confirmatory factor analysis, on the other hand, is a more sophisticated method employed in the advanced stages of the research to test hypotheses about latent⁴ variables (Tabachnick & Fidell, 2007; Kinnear & Gray, 2009). In confirmatory factor analysis, the researcher forces items to load only on a specific factor and wants to *confirm* a hypothesised factor structure in the data (Stevens, 2001).

In this study, exploratory factor analysis is used to aid the refinement of the questionnaire. This technique will enable assessing the factorial validity of the items that make up the research questionnaire by demonstrating the extent to which they seem to be measuring the same concepts or variables. Exploratory factor analysis is a widely applied statistical technique in the social sciences. (Costello & Osborne, 2005). This statistical technique has three main uses:

- to understand the structure of a set of variables;

- to aid in the construction of a questionnaire;

- and to reduce a dataset to a more manageable size while retaining as much of the original information as possible (Field, 2009).

According to Kinnear and Gray (2009), exploratory factor analysis is characterised by three stages:

⁴ Latent variables are latent in the sense that they are not immediately observable, i.e. there are no direct and obvious measures that capture the essence of the variable (Straub et al., 2004).

A matrix of correlation coefficients is generated for all potential pairs of the variables.

From the correlation matrix, factors are extracted. The most common method of extraction is principal components.

The factors are then rotated to ease the interpretation of the results.

However, prior to analysing data, it is essential to assess its suitability for factor analysis. There are two statistical tests to assess the factorability of the data namely, the Kaiser-Meyer-Olkin's (KMO) measure of sampling adequacy and the Bartlett's test of Sphericity. KMO is a test of factorability, which assesses the amount of variance within the data that can be explained by factors (Brace et al., 2006). The KMO index ranges from 0 to 1 and can be interpreted with the following guidelines: 0.90 or above is marvellous, 0.80 is meritorious, 0.70 is middling, 0.60 is mediocre, 0.50 is miserable and below 0.50 is unacceptable (Dunteman, 1989; Hair et al., 2006). The other test is Bartlett's test of Sphericity that tests for the overall significance of all correlations within a correlation matrix (Hair et al., 2006). The outcome of the Bartlett's test should be significant for the factor analysis to be considered appropriate. The test examines the null hypothesis that there is no factor structure, i.e. the variables are uncorrelated (Larose, 2006). The statistic used in this test is the *p*-value. A very small value indicates evidence against the null hypothesis, whereas a *p*-value larger than 0.10, indicates that there is insufficient evidence that the variables are not uncorrelated, thus factor analysis may not be appropriate (Larose, 2006).

Table 5-5 shows that the KMO value is .929 indicating a high sampling adequacy for the factor analysis. Moreover, the *p*-value for Bartlett's test of Sphericity rounds to zero, which means that the null hypothesis that no correlation exists among the variables is rejected. As such, both the KMO and Bartlett's tests indicated that it is appropriate to conduct factor analysis on this dataset.

Table 5-5: KMO and Bartlett's Test results

KMO	.929
Bartlett's Test of Sphericity	Approx. Chi-Square 17794.200*
	df 1176
* <i>P</i> < .001	

In performing factor analysis, a key step is to choose a method for extracting the factors from the data. Factor extraction is the process of identifying the unique factors. There are several extraction methods; however, the most commonly used method is Principal Component Analysis (PCA), which was employed in this pilot study.

After choosing the extraction method, the decision on how many factors to retain is the next step. There are several methods for identifying the required number of factors including Kaiser's criterion of eigenvalues, the scree plot, Velicer's MAP

criteria, and parallel analysis (Costello & Osborne, 2005). In order to determine the optimal number of factors to extract in this piloting phase, the Kaiser-eigenvalues criterion was used (Stevens, 2001). It involves retaining factors whose eigenvalues are greater than one. Although there are some controversies regarding the best method to help decide the number of factors to extract, Stevens (2001) points out that the Kaiser criterion is quite accurate when the sample size is above 250 and the mean communality is $\geq .60$. Thus, the communalities were inspected to check if the variables are well defined by the solution. Communalities specify the percentage of variance in a variable that overlaps variance in the factors (Tabachnick & Fidell, 2007). The communality values for all the variables were quite high ($\geq .50$) (see Appendix 5E) and the average of the communalities was 0.73 which is also above the .60 rule. Hence, the use of the Kaiser criterion to decide the number of factors to retain for this research is reliable (Stevens, 2001).

Twelve components (factors) have eigenvalues greater than 1 and thus they were retained (detailed tables of the results are given in Appendix 5E). In a good factor analysis solution, few factors explain a substantial portion of the variance and the remaining factors explain relatively small amounts of variance. Although there is no clear cut-off point that can be adopted, generally, in the social sciences, factors solutions that account for 60% of the total variance explained can be considered satisfactory (Hair et al. 2006). Overall, the results showed that the first few factors accounted for a large percentage of the total variance. The twelve factors that were extracted accounted for 72.376% of the total variance (see Appendix 5E).

Before interpreting the results of the factor analysis, another step is taken to facilitate the interpretation process. This is factors rotation. Rotation is a strategy (mathematical) that helps to make the pattern of loadings more understandable (Brace et al., 2006). There are two types of rotation methods: orthogonal rotation, which produces factors that are uncorrelated (e.g. Varimax, Quartimax, and Equamax) and oblique rotation, which allows the factors to correlate (e.g. direct Oblimin, Quartimin, and Promax) (Costello & Osborne, 2005). Hair et al. (2006) state that the choice of an orthogonal or oblique rotation should be made on the basis of the specific needs of a given research situation. If the goal is to reduce the number of original variables, no matter how meaningful the emerged factors may be, an orthogonal solution is suitable. However, Bagozzi and Phillips (1982) noted that orthogonal rotation assumes uncorrelated traits or factors, and its application to data with correlated factors can produce distorted factor loadings and erroneous conclusions about the number of factors. On the other hand, if the goal of factor analysis is to achieve some theoretically meaningful factors, oblique rotation is the appropriate method. For the purpose of this research, an oblique rotation using the direct Oblimin rotation technique was used as it corresponds to the clustering of items more precisely (Ndubisi, 2006; Hair et al., 2006).

The rotated matrix was next inspected to determine the items that load on each factor. In interpreting factors, a decision must be made regarding which factor loadings are worth inclusion. Hair et al. (2006) suggest that factor loadings greater than ± 0.30

should be considered to meet the minimum level; loadings of ± 0.40 are regarded as more important; and if the loadings are ± 0.50 or greater, they are regarded as practically significant. Stevens (2001) suggest testing each loading for significance and provides a table of critical values associated with different sample sizes. According to Stevens' criteria, with $N = 123$, a significant loading should be above $2 * (.256) = 0.512$, where .256 is the critical value associated with a sample of 100. In addition, Gardner (2001) provides another rule of thumb; the significant items loading would be different for different sample sizes. If the sample size is 100, the factor loading has to be over 0.40 for identifying significance; however, if the sample size is less than 100, loading over 0.50 is significant. In effect, as the pilot study sample was 123, items that loaded higher than 0.40 were retained while lower loading items were dropped.

The results show the factor loadings for all twelve constructs (see Appendix 5E). Almost all the items loaded above 0.40, which is the minimum recommended value. In addition, the majority of the items loaded on their factors as expected except for a few items that will be discussed.

All seven items of the ISE construct loaded on component 1. Thus, the first factor represents the underlying construct of ISE. Items loadings for this factor were all above 0.60 (.806, .804, .789, .750, .689, .678).

The second factor represents the construct of PU as six of the items of the construct loaded on this factor. The coefficients of the six items were all above 0.40 (.794, .785, .722, .610, .548, .458). Thus, the second factor represents the underlying construct of PU. However, one of the items (pu7) was found to load more on the construct of PF (.525). Upon careful inspection, it was decided to include this item under the construct of PF as provision of a rich amount of information for study is regarded as an aspect of the flexibility of e-learning. Further checks of this modification will be done in the second pilot study as will be described later.

Only two out of the four items of the SN sub-scale loaded on component three. The coefficients of the two items were above 0.60 (.821, .812). However, two of the items did not load on any factor. The two ill-behaved items were the ones framed with the negative statements. Therefore, it was decided to rewrite them in a positive way before taking any decision to drop them from the scale. The third factor represents the underlying construct of direct SN with only two items.

Three of the items of the PF sub-scale loaded on the fourth factor. The coefficients were all above 0.70 (.739, .706, .701). Yet, one item (pf1) loaded unexpectedly on more than one factor. The item cross-loaded on the construct of attitude and PU, thus it was decided to drop it as suggested by Straub et al. (2004).

All the items of PEOU construct loaded on component five. The loadings were all above 0.60 (.746, .711, .694, .681). Thus, the fifth factor represents the underlying construct of PEOU.

All the items of the US sub-scale loaded on factor six with loadings above 0.70 (.891, .866, .768). Therefore, the sixth factor represents the underlying construct of US.

Four of the items of the PA sub-scale loaded on the seventh factor with loadings above 0.60 (.775, .733, .726, .623). Thus, the seventh factor represents the underlying construct of perceive accessibility. However, one item (pa3) was found to load more on the construct of US (.664). Upon careful looking, it appeared that this particular item revolves around the speed of the internet service on the university campus, which can be considered as one aspect of the support provided by the university to encourage e-learning. Therefore, this item was added to the US construct. Moreover, another item (pa6) was not found to load on any factor, thus it was decided to drop it. This item was suggested during the content validity study and is concerned with the students' ownership of a personal computer.

All three items of the PI sub-scale loaded as expected on the eighth factor with loadings above 0.60 (.751, .713, .642). As such, this factor represents the underlying construct of PI.

Similarly, all three items of the attitude sub-scale loaded cleanly on the ninth factor with loadings above 0.60 (.741, .667, .625). Thus, this factor corresponds to the construct of attitude.

One item of the PBC sub-scale loaded on factor ten with loadings above .833. The other item (pbc2), however, cross-loaded on the tenth factor and on the factor of BI to adopt e-learning for distance education. As such, this item (pbc2) was a candidate for dropping. However, as this sub-scale would then only have a single item, which is not recommended for reliability reasons, it was decided to modify its wording and keep it for further revision .

All the items in the BI to adopt e-learning as a supplementary tool sub-scale loaded on factor ten with coefficients above 0.50 (.904, .884, .529). This implies that the eleventh factor represents the BI to adopt e-learning as a supplementary tool construct.

Finally, the two items of the BI to adopt e-learning for distance education sub-scale loaded on the twelfth factor with loadings above 0.60 (.671, .653). Therefore, this factor represents the underlying construct of BI to adopt e-learning for distance education construct.

The modifications in the structure of some sub-scales and items will be further checked in the second pilot stage that will be discussed next.

From the above discussion, the factor analysis shows an evidence of construct validity (both convergent and discriminant validity) in the research measures. However, some items were problematic as they either cross-loaded or did not load on any factor. Therefore, it was decided to modify some sub-scales and reassess the reliability, and construct validity of the questionnaire items before the main study.

5.7.3 SECOND PILOT STUDY

The purpose of this stage was to ensure that the modifications done to the research instrument would result in improved psychometric properties. Particularly, of concern

was the PBC, SN, PU, PF and PA sub-scales. A sample of 96 students was taken from the Faculty of Arts and Humanities and consisted of female students only. This is mainly because of time and resources constraints. Appendix 5F displays the reliability of the modified instrument. In summary, all the subscales showed excellent to high alpha scores. Additionally, the alpha level of the revised whole scale showed an excellent alpha level of 0.952. The factor analysis results are reported also in Appendix 5F. Briefly, twelve factors were extracted with all items loaded cleanly as expected.

Once the research instrument showed good validity and reliability, it is now appropriate to conduct the main study that will answer the research questions (see Appendix 5G for the final questionnaire). This will be explained in the next chapter. However, as this research has relied mainly on a single instrument ‘the self-report questionnaire’ to collect the study data, there was some concern about common method bias that may yield “potentially misleading conclusions” (Campbell & Fiske, 1959). Campbell and Fiske (1959) contend that common methods bias is a major threat to construct validity. Sometimes, respondents have a tendency to respond to an instrument in certain patterns “if the instrument, unwittingly, encourages such responses” (Straub et al., 2004). Thus, it was crucial to investigate common method bias as will be discussed in the next section.

5.8 COMMON METHOD BIAS

Common method bias, also termed as ‘method halo’ or ‘method effects’ (Straub et al., 2004), is one of the major causes of measurement error that threatens the validity of research (Bagozzi & Yi, 1990; Podsakoff, MacKenzie, Lee & Podsakoff, 2003). It is the “variance that is attributable to the measurement method rather than to the constructs the measures represent” (Podsakoff et al, 2003, p. 879) and it can have serious influences on empirical results, causing potentially misleading conclusions (Campbell & Fiske, 1959).

Common method bias may stem from the fact that the data is gathered via only a single method (Campbell & Fiske, 1959), the predictor and criterion variables are obtained from the same source or rater or it can be a result of social desirability phenomena (Fife-Schaw, 2006). In addition, the measurement items themselves and the context of the items within the measurement instrument can produce common method bias (e.g. time and location of measurement) (Malhotra, Sung, Kim, & Patil, 2006).

Podsakoff et al. (2003) provide some suggestions to minimise and eliminate common method bias. They point out that this can be either accomplished in the design of the study or through some statistical controls. For instance, to minimise the influence of obtaining the measurement of the predictor and criterion variables from the same source, the researcher can use different sources. However, this is not always feasible in research contexts. Another potential remedy for this situation is to separate the measurement of the predictor and criterion variables by creating a temporal separation or a time-lag between the measurement of the predictors and the criterion. However,

such a technique is not also practical in many instances where there is a time constraint. Nevertheless, by using various response formats (e.g. semantic differential, Likert scales), the researcher can create a methodological separation that can reduce common method bias (Podsakoff et al., 2003). In addition, it is possible to minimise method bias through the careful construction of the questionnaire items (Podsakoff et al., 2003). Weinberger, Darkes, Del Boca, Greenbaum and Goldman (2006) state that items' ambiguity is one of the most common problems in the comprehension stage of the response process.

To reduce common method bias in the study, several steps were taken. Different scale endpoints and formats for the predictors and criterion measures were used as recommended by Podsakoff et al. (2003). For example, in gauging BI, the endpoints utilised were definitely false - definitely true, whilst for measuring the majority of the independent factors the scales were anchored as strongly disagree - strongly agree. For measuring PBC, no control - complete control were employed. This technique reduces method bias caused by commonalities in scale endpoints and anchoring effects. In addition, the use of bipolar numerical scale values (e.g., -3 to +3) was avoided as it increases the tendency to agree with attitude statements regardless of content (Tourangeau, Rips & Rasinski, 2000). Another way to diminish method bias in this research was through avoiding ambiguity as much as possible. This was accomplished by defining any ambiguous or unfamiliar term (e.g. e-learning, supplementary purposes, distance education) in the cover sheet. Moreover, to ensure understanding of all the scale points, verbal labels for the midpoints of scales were given (Tourangeau et al., 2000; Podsakoff et al., 2003). Concerning the social desirability influence, this factor was reduced by assuring the respondents of anonymity, that there is no right or wrong answer and that they should answer questions as honestly as possible (Podsakoff et al., 2003).

It is also possible by using statistical procedures to spot the existence of common method bias. Harman's single-factor test is one technique that has been widely used to detect common method variance (Podsakoff et al., 2003). In this technique, all the study variables were entered into a principal component analysis and the unrotated factor solution was examined to determine the number of factors that account for the variance in the variables. The basic assumption of this test is that if a considerable amount of common method variance exists, (1) a single factor will emerge from the unrotated factor solution, or (2) a first factor will explain the majority of the variance in the variables (Podsakoff et al., 2003). All the variables in the questionnaire were loaded into a principle component analysis with an unrotated solution. The analysis resulted in 12 distinct factors with eigenvalues greater than 1.0, rather than a single factor. The twelve factors accounted for 70.3 percent of the total variance and the first factor did not account for a majority of the variance (32%). Therefore, no common factor is evident.

In addition, a confirmatory factor analysis (CFA) can be employed to detect the common method bias (Iverson & Maguire, 2000). Method biases are considered

substantial if the hypothesised model fits the data well. All variables were hypothesised to load on a single factor. By using a special software for conducting CFA (Amos v.6), the single-factor model was tested to see if it fits the data. If common method bias is responsible for the relationships among the variables, the hypothesised one-factor model should fit the data well. However, the results demonstrated that the single-factor model did not fit the data well as all the fit indices were below the recommended values for model acceptance: Chi-square = 9013.124, degrees of freedom = 1034, probability level = .000; GFI = .497; AGFI = .451; TLI = .502; CFI = .523; RMSEA = .121.

The results of these analyses suggest that the common method bias in this study is not significant and thus it is not likely to confound the interpretations of results.

5.9 SUMMARY

This chapter has described how the research main instrument, the survey questionnaire, was developed and validated. The questionnaire consisted of previously developed and validated items (BI, AT, SN, PBC, ISE, PU, PEOU and US) as well as newly developed items (PF, PI, PA and NBs). The adopted measurements were all derived from well-established theories and have been subjected to rigorous validation in numerous previous studies. In addition, the research questionnaire went through several validation and piloting stages. Firstly, the questionnaire items were translated and reviewed. Next, a rigorous content validity round was undertaken by a panel of four experts in e-learning. After that, the instrument was given to five participants from the study population to review and address overall timing, typos, layout and comprehensibility issues. Once the instrument was ready, it was first piloted with 132 students to establish its reliability and construct validity. Based on the results of this first piloting stage, some modifications were made and re-evaluated in another pilot study with 94 female students. The results showed excellent reliability and validity; hence, the appropriateness of the instrument for the main study. The steps associated with the development and validation process are depicted in figure 5-1 below. The chapter has also discussed the issue of common method bias.

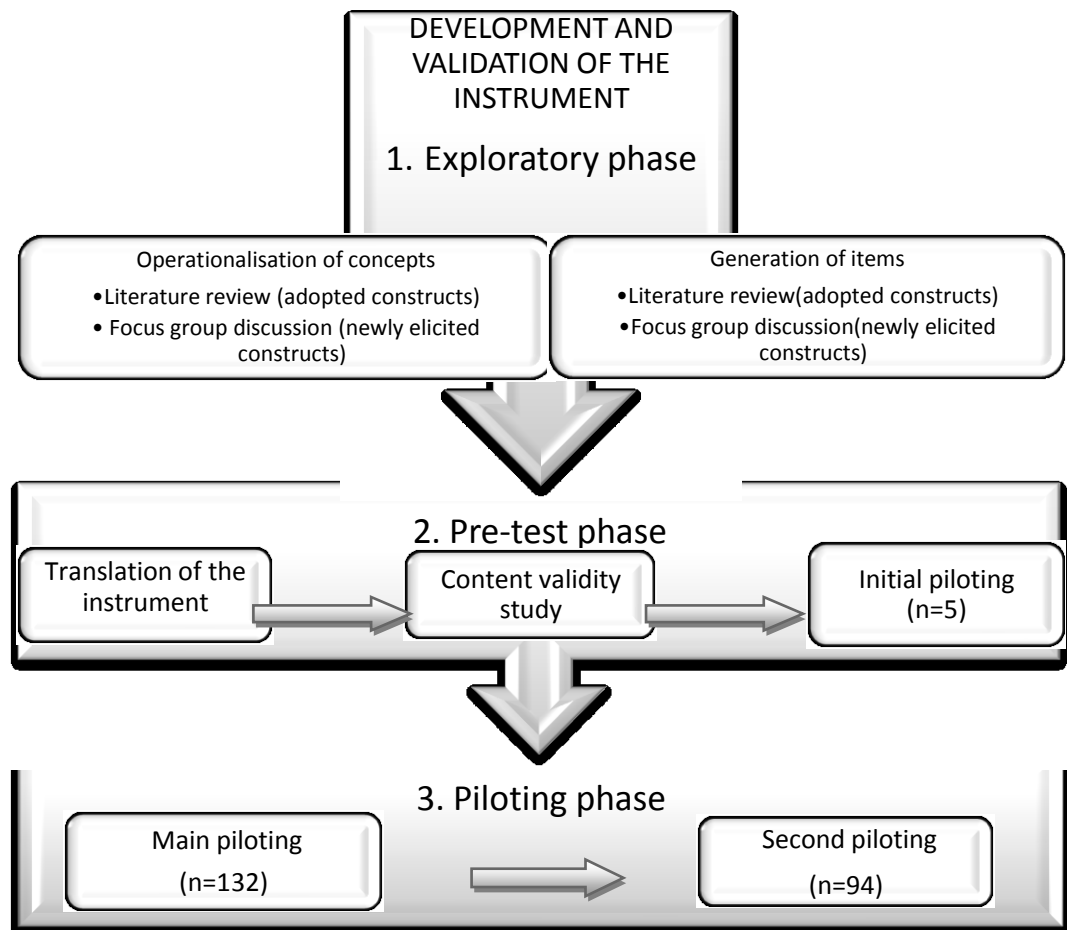


Figure 5-1: A schematic representation of the instrument validation process

6.1 INTRODUCTION

In the previous chapters, the theoretical background and research methods adopted in this research were described. This chapter presents the results of the analyses conducted on the data. This research aimed to investigate the underlying factors that influence the students' behavioural intention to adopt e-learning as a supplementary tool and for distance education in the Saudi higher education context. Four research questions were posited to fulfil the aim of this research:

1. *Does the research conceptual model with its proposed factors explain the students' behavioural intention to adopt e-learning as a supplementary tool and for distance education?*
2. *Does gender and internet experience moderate the relationships between the three proposed determinants of behavioural intention (Attitude, Subjective Norm and Perceived Behavioural Control) and behavioural intention to adopt e-learning as a supplementary tool and for distance education?*
3. *Do the three proposed determinants of behavioural intentions to adopt e-learning (Attitude, Subjective Norm and Perceived Behavioural Control) mediate the relationships between their respective salient beliefs and behavioural intention to adopt e-learning as a supplementary tool and for distance education?*
4. *Do the students differ in their behavioural intention to adopt e-learning as a supplementary tool and for distance education based on selected demographics?*

This chapter starts by presenting the results of the assessment of the research instrument. It next describes the demographics of the study sample. Moreover, the chapter provides the answers to the four research questions. Then, it presents the findings emerged from the semi-structured interviews. Finally, the chapter concludes with a summary.

6.2 RESULTS OF THE PSYCHOMETRIC ASSESSMENT OF INSTRUMENT

To ensure that the research instrument is robust, it was essential to assess its reliability and validity. Evaluating the reliability and validity of the instrument should be done before any statistical techniques are done on the generated data. This is, primarily to be confident that the data and afterwards, the findings are of high quality which allows making valid conclusions (Straub, 1989).

6.2.1 INSTRUMENT RELIABILITY

Reliability is an evaluation of the measurement accuracy and stability. The Cronbach alpha scores for the main study scales (illustrated in table 6-1) passed the 0.80 level used as a gauge for reliable measures⁵ (Straub, 1989).

Table 6-1: Results of reliability analysis of the main study scale

<i>Scale</i>	<i>α</i>
BIS	.822
BID	.917
AT	.847
SN	.860
PBC	.926
ISE	.886
PU	.911
PEOU	.919
US	.837
PF	.828
PI	.852
PA	.809
Whole scale	.949

Four scales had excellent reliability and eight scales had high reliability (Hinton et al., 2004). Straub (1989) indicated that, “findings based on a reliable instrument are better supported, and parameter estimates are more efficient” (p.160). Since the research instrument demonstrated high and excellent reliability scores, one can have greater confidence in the data obtained through this instrument.

6.2.2 CONSTRUCT VALIDITY

One method for examining the instrument construct validity was by establishing the factorial validity of its constructs (Bagozzi, 1980). Factorial validity assesses both convergent and discriminant validity by using factor analytic techniques such as exploratory factor analysis and confirmatory factor analysis (Straub et al., 2004). The results of the pilot study showed that the research instrument demonstrated a good indication of construct validity; however, some items and subscales needed some modifications. As a result, it was crucial to ensure that the instrument in the main study show also evidence of construct validity.

Initially, the factorability of the data was checked by looking at the KMO measure of sampling adequacy and the Bartlett’s test of Sphericity. The results of the two tests

⁵ It is worth noting that the normative belief items were excluded from the reliability test. The reason for this is justified by Ajzen (2006) the developer of TPB. He contends that because an individual may have several important others who can hold different or even opposing views regarding a topic, the normative beliefs can be diverse and inconsistent. Consequently, “internal consistency is not a necessary feature of belief composites” (Ajzen, 2006, p. 8). Francis et al. (2004) adopted a similar view.

showed that the data met the necessary requirements for factor analysis. Next, the research data was factor analysed using principal component analysis with oblique rotation. The oblique rotation method, specifically, direct Oblimin rotation was selected over orthogonal rotations because the independent variables were not assumed to be completely uncorrelated (Ndubisi, 2006; Hair et al., 2006). Twelve distinct factors emerged explaining 73.8% of the variance observed in the underlying items (Appendix 6A).

As seen in table 6-2 below, all the item loadings were significant and above 0.40. Factor one had six items with loadings greater than 0.45 and no significant loadings on any other factor. The items were associated with PU. Factor two had seven items with loadings greater than 0.60 and had no significant loadings on any other factor. The items were associated with ISE. Factor three had four items with loadings greater than 0.60 and no significant loadings on any other factor. The items were associated with US. Factor four had four items with loadings greater than 0.60 and no significant loadings on any other factor. The items were associated with SN.

Factor five had three items with loadings greater than 0.50 and no significant loadings on any other factor. The items belonged to the construct of BIS. Factor six had four items with loadings greater than 0.50 and no significant loadings on any other factor. The items were associated with PA. Factor seven had two items with loadings greater than 0.80 and no significant loadings on any other factor. The items were associated with PBC. Factor eight had four items with loadings greater than 0.45 and no significant loadings on any other factor. The items belonged to the construct of PF. Factor nine had three items with loadings greater than 0.60 and no significant loadings on any other factor. The items were associated with PI. Factor ten had three items with loadings greater than 0.50 and no significant loadings on any other factor. The items were associated with attitude. Factor eleven had four items with loadings greater than 0.70 and no significant loadings on any other factor. The items were associated with PEOU. Factor twelve had two items with loadings greater than 0.50 and no significant loadings on any other factor. The items were associated with BID.

As evident from above, the ultimate factor analysis solution confirmed construct validity in the research measures. Referring to table 6-2, convergent validity was established as all the extracted factors had Eigenvalues of 1 and the items loaded cleanly on their associated factors (loadings of $> .40$) (Straub et al., 2004). Similarly, discriminant validity was established as all items loaded cleanly on their associated factors (loadings of $> .40$) and did not cross-load (Straub et al., 2004).

Table 6-2: Items loadings, eigenvalues and variance explained

Factor	Loadings	(Eigenvalue & variance explained)
pu2	.807	(Eigenvalue 15.337, 33.342 % of variance)
pu3	.785	
pu4	.687	
pu1	.496	
pu5	.464	
pu6	.459	
ise5	.800	(Eigenvalue 3.722, 8.029 % of variance)
ise3	.766	
ise7	.757	
ise2	.742	
ise6	.708	
ise1	.697	
ise4	.683	(Eigenvalue 2.772, 6.025 % of variance)
us2	.902	
us1	.880	
us3	.764	
us4	.654	(Eigenvalue 2.145, 4.663 % of variance)
sn3	.869	
sn1	.861	
sn2	.736	
sn4	.633	(Eigenvalue 1.724, 3.748 % of variance)
bis3	.941	
bis1	.920	
bis2	.509	(Eigenvalue 1.652, 3.592 % of variance)
pa1	.799	
pa2	.758	
pa3	.749	
pa4	.589	(Eigenvalue 1.379, 2.992 % of variance)
pbc2	.908	
pbc1	.878	(Eigenvalue 1.288, 2.801 % of variance)
pf3	.732	
pf4	.723	
pf2	.703	
pu7	.492	(Eigenvalue 1.081, 2.351 % of variance)
pi2	.804	
pi1	.773	
pi3	.672	(Eigenvalue 1.070, 2.326 % of variance)
at2	-.730	
at3	-.702	
at1	-.593	
peou3	.859	(Eigenvalue 1.019, 2.215 % of variance)
peou4	.814	
peou2	.804	
peou1	.765	
bid2	-.577	(Eigenvalue 1.009, 2.193 % of variance)
bid1	-.560	

6.3 RESPONDENTS' DEMOGRAPHICS

The questionnaire was administered to 550 students. After reviewing the completed surveys, 19 questionnaires were not completed correctly and thus were discarded. A total of 531 questionnaires were retained for the final analysis. Table 6-3 shows the respondents' characteristics including their gender, mode of study, place of residence, job and family responsibilities, faculty, personal computer ownership, type of internet connection and internet experience.

Table 6-3 shows that in terms of gender, there were 322 (60.6%) female students and 209 male students (39.4%). Three-quarters of the sample were full-time students, 84.2% whereas only 15.8% were part-time. This could be expected and matches students' overall status distribution in the University (King Abdul Aziz University Facts Book, 2007).

Moreover, 76.3% of the sample was from Jeddah (the city where the University is located), and 23.7% was from the towns and villages outside Jeddah. In addition, based on the responses, it was found that 69.3% of the sampled students had job responsibilities (e.g. worked part-time, voluntary work). This was not expected, as most of the students were full-time students who do not even have to pay tuition fees. However, it could be that most of the students were involved in some kind of charity work or voluntary activities that are greatly encouraged by the University.

In addition, the majority of the students (69.5%) had family responsibilities (e.g. child or parents to care about). This is acceptable as the average age of the students in the sample was 21 years, which is considered an acceptable age for marriage in the Saudi society (Al-Mazrou, Farid, and Khan, 1995). The greatest number of respondents was from the faculty of Economics and Administration (50.7%).

The responses also showed that computer ownership was very high in that 81% of the sample reported possessing a computer, while only 19 % did not. This high rate of ownership was probably due to the University's initiative to help its students to own a computer. It is worth noting that this rate of computer ownership is higher than that reported in Al-Arfaj's study of 2001, where 60.6 % of Saudi University students claimed computer ownership.

Concerning internet connection, almost half of the students sampled reported (54.0%) having a DSL internet connection, whereas only 10 (1.9%) students did not have any. It is thus not surprising that of these 531 respondents, the majority (61.8%) considered themselves as to have high internet experience.

Interestingly, only 14.5% of the students in the sample identified themselves as to have little or no internet experience. This is in line with the responses obtained regarding the frequency of using the internet where the majority (74%) regarded themselves as frequent users and only 7.7% considered themselves as non-users. The

results thus indicated that the majority of the students are technology savvy. Al-Somali et al. (2009) also reported similar findings in a recent study in Saudi Arabia.

Table 6-3: Demographics of the respondents of the questionnaire

		<i>Frequency</i>	<i>Percentage</i>	<i>Mode</i>
Gender	Male	209	39.4	Female
	Female	322	60.6	
Mode of study	Full-time	447	84.2	Full-time
	Part-time	84	15.8	
Place of residence	Urban	405	76.3	Urban
	Rural	126	23.7	
Has a job?	Yes	368	69.3	Yes
	No	163	30.7	
Has family responsibility?	Yes	369	69.5	Yes
	No	162	30.5	
Faculty	Arts and Humanities	97	18.3	Economics and Administration
	Home Economics	27	5.00	
	Computer Sciences and Informatics	5	0.9	
	Economics and Administration	269	50.7	
	Medicine	27	5.1	
	Science	106	20.0	
Personal computer ownership	Has a computer	430	81.0	Has a computer
	No	101	19.0	
Type of Internet connection	Dial-up	187	35.2	DSL
	DSL	287	54.0	
	Satellite	18	3.4	
	Wireless	29	5.5	
	No connection	10	1.9	
Period of Internet usage	Little experience	77	14.5	High experience
	Average experience	126	23.7	
	High experience	328	61.8	
Frequency of Internet usage	Non-user	41	7.7	Frequent user
	Average user	97	18.3	
	Frequent user	393	74.0	
Usage of the Internet for study	User	393	73.4	User
	Non-user	138	26.0	
Total number of students		531		

6.4 ANSWERING THE RESEARCH QUESTIONS

6.4.1 ANSWERING RESEARCH Q1: EXPLAINING BI TO ADOPT E-LEARNING

The first research question posed in this study was:

Does the research conceptual model with its proposed factors explain the students' behavioural intention to adopt e-learning as a supplementary tool and for distance education?

In answering this question, the study proposed a model to explain students' BI to adopt e-learning (figure 6-1). The following six hypotheses were tested:

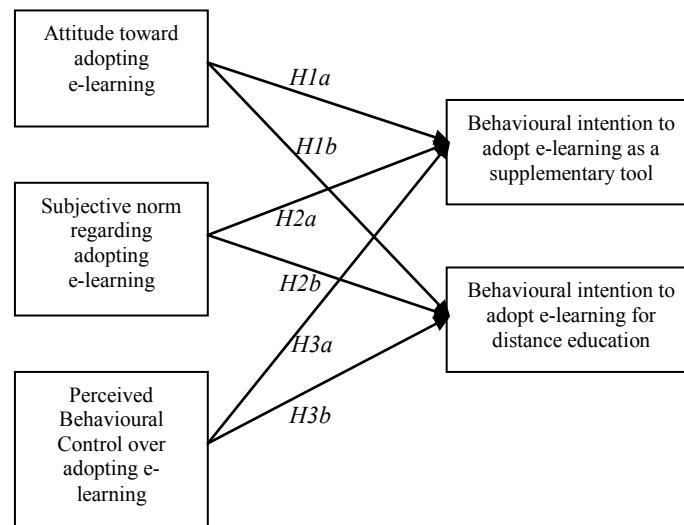


Figure 6-1: Factors explaining BI

H1a: Attitude will influence the students' behavioural intention to adopt e-learning as a supplementary tool.

H1b: Attitude will influence the students' behavioural intention to adopt e-learning for distance education.

H2a: SN will influence the students' behavioural intention to adopt e-learning as a supplementary tool.

H2b: SN will influence the students' behavioural intention to adopt e-learning for distance education.

H3a: PBC will influence the students' behavioural intention to adopt e-learning as a supplementary tool.

H3b: PBC will influence the students' behavioural intention to adopt e-learning for distance education.

Multiple regression analysis was used to assess these hypotheses. To check the assumptions of regression analysis, the scatter plots of the standardised residuals against the predicted dependent variable scores were examined. The resulting overall shapes of

the two scatter plots indicated reasonable consistency of spread through the distributions, hence these assumptions were not violated (Appendix 6B). In examining the outliers, one extreme multivariate outlier (case number=142) was identified using Mahalanobis' distance using a critical value of 16.27. On looking at the scores of this participant, it appeared that he scored very low on almost all scales. Yet his attitude towards adopting e-learning was very positive and he reported very high internet experience. It was decided to delete this case, as it is highly unlikely to have a very negative perception of e-learning attributes and at the same time have a positive attitude towards using it. This person might have responded to the questionnaire carelessly. Cases with the next four highest Mahalanobis' distances were also examined. By carefully assessing these cases, it became clear that they had reasonable responses and thus it was better to retain them as Hair et al. (2006) suggested. Hair et al. (2006) argued that if the outliers represent a segment of the population as in this case, they must be retained to ensure generalisability to the entire population. They warned that, "as outliers are deleted, the analyst is running risk of improving the multivariate analysis but limiting its generalisability" (p.76). Therefore, it was decided to retain them for generalisability purposes as well as for validity in the results.

In addition, when a second regression analysis was run on the dependent variable BI to adopt e-learning for distance education, seven potential multivariate outliers (cases number=361, 355, 211, 113, 93, 50, 27) were identified using Mahalanobis' distance with a critical value of 16.27. On examining these outliers closely, it was found that these cases have extreme perceptions and attitudes regarding e-learning compared to the rest of the sample. As this research investigates students' perceptions, it is common to find students with such strong feelings towards a topic. This, as Pallant (2007) argues, may reflect a genuine characteristic of the variables distribution. Accordingly, it is quite possible for these extreme cases to exist and that deleting them will have an effect on the generalisability of the findings (Tabachnick & Fidell, 2007). As such, it is not always desirable to remove the outliers (Osborne & Waters, 2002). Nonetheless, to make sure that their presence will not have an effect on the analysis, the outlier cases were deleted and another multiple regression analyses were re-run. The coefficients of determination and the beta weights did not change substantially; therefore, it was decided to retain these cases in the analyses.

6.4.1.1 Determinants of BI

The model proposes that attitude, SN and PBC influence the students' BIS. The analysis produced a model with an R^2 of .197 [$F(3, 527) = 43.156, p < .001$] for the explanation of BIS. This means that 20% of the variance in BIS is explained by the proposed set of factors. Yet, at the same time, this means that 80% of the variation stems from other unexplored variables. To determine which independent variable was a significant contributor to the explanation of the dependent variable, the beta weights were checked.

Table 6-4: Summary of regression analysis for variables explaining BIS

	<i>B</i>	<i>SE</i>	β	<i>t</i>	<i>95% CI</i>	
(Constant)	2.263	.298		7.595	1.678	2.849
Attitude	.174	.053	.163*	3.275	.069	.278
SN	.200	.052	.188*	3.858	.098	.302
PBC	.310	.064	.210*	4.859	.184	.435
$R^2 = .197, *p < .01$						

Table 4-6 shows that the highest beta weight was for PBC ($\beta=.210$); the second highest significant beta weight was for SN ($\beta=.188$); while attitude ($\beta=.163$) came third. Thus, hypotheses H1a, H2a and H3a were supported.

Table 6-5: Summary of regression analysis for variables explaining BID

	<i>B</i>	<i>SE</i>	β	<i>t</i>	<i>95% CI</i>	
(Constant)	-.222	.321		-.691	-.853	.409
Attitude	.403	.070	.272**	5.760	.266	.541
SN	.134	.065	.090*	2.057	.006	.261
PBC	.415	.054	.340**	7.717	.310	.521
$R^2 = .412, *p < .05, **p < .001$						

As with the second dependent variable, the value of R^2 was .412 [$F(3, 527) = 101.696, p < .001$] for the explanation of BID. Looking at the individual determinants of BID in table 6-5, PBC had the strongest significant effect on BID ($\beta=.340$). Attitude had also a strong significant influence on BID ($\beta=.272$). However, SN ($\beta=.090$) had a marginally significant effect on BID. Hence, hypotheses H1b, H2b and H3b were supported.

6.4.1.2 Attitudinal beliefs underlying attitude

The aim of this research was to understand and explain the factors underlying BIS and BID. Thus, each determinant of BI that is attitude, SN and PBC was decomposed into its salient beliefs.

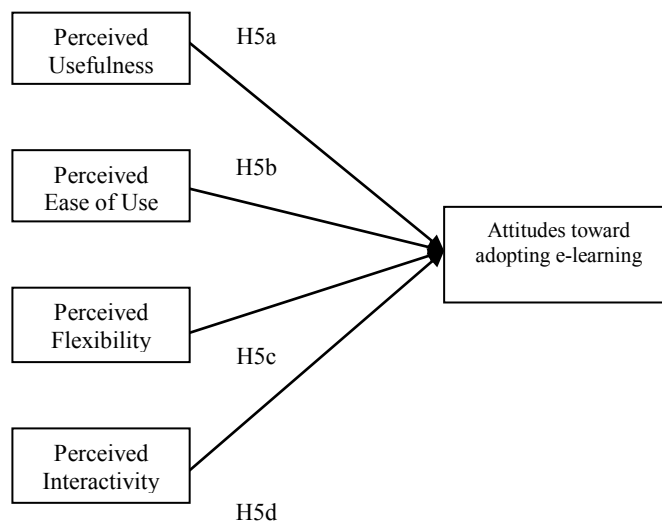


Figure 6-2: Proposed antecedents of AT

To see what underlie students' attitude, four salient beliefs were hypothesised to influence attitude (figure 6-2). Table 6-6 shows that the four behavioural beliefs contributed significantly [$F(4, 526) = 114.902, p < .001$] and explained 50% of the variations in students' attitude. Further, the results showed that PEOU had the strongest significant effect on attitude ($\beta = .330$), followed by PU ($\beta = .263$), PI ($\beta = .121$) and finally PF ($\beta = .101$). Thus, hypotheses H5a, H5b, H5c and H5d were supported.

Table 6-6: Summary of regression analysis for variables explaining attitude

	<i>B</i>	<i>SE</i>	β	<i>t</i>	95% CI for <i>B</i>	
(Constant)	1.168	.212		5.496	.750	1.585
PU	.274	.052	.261**	5.278	.172	.376
PEOU	.306	.044	.320**	6.898	.219	.393
PF	.095	.040	.101*	2.363	.016	.174
PI	.108	.045	.109*	2.409	.020	.196
$R^2 = .466, *p < .05, **p < .001$						

6.4.1.3 Normative beliefs underlying SN

Three normative beliefs were hypothesised to influence SN (figure 6-3).

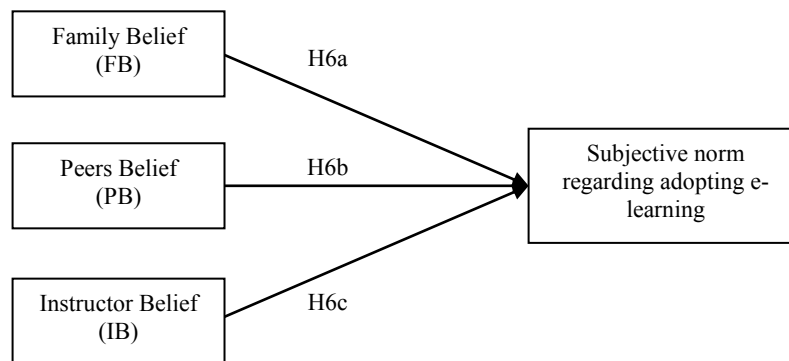


Figure 6-3: Proposed antecedents of SN

As table 6-7 displays, the three beliefs explained 30% of variation in SN [$F(3, 527) = 70.019, p < .01$]. PB had the strongest effect on SN ($\beta = .407$). FB had also significant effect on SN ($\beta = .164$). IB had the least contribution to the explanation of SN ($\beta = .104$). Hence, hypotheses H6a, H6b and H6c were supported.

Table 6-7: Summary of regression analysis for variables explaining SN

	<i>B</i>	<i>SE</i>	β	<i>t</i>	95% CI for <i>B</i>	
(Constant)	2.265	.246		9.210	1.782	2.749
PB	.311	.032	.407**	9.794	.249	.374
FB	.155	.036	.164**	4.250	.083	.226
IB	.084	.033	.104*	2.551	.019	.149
$R^2 = .285, *p < .05, **p < .001$						

6.4.1.4 Control beliefs underlying PBC

Three control beliefs were also hypothesised to influence PBC (figure 6-4).

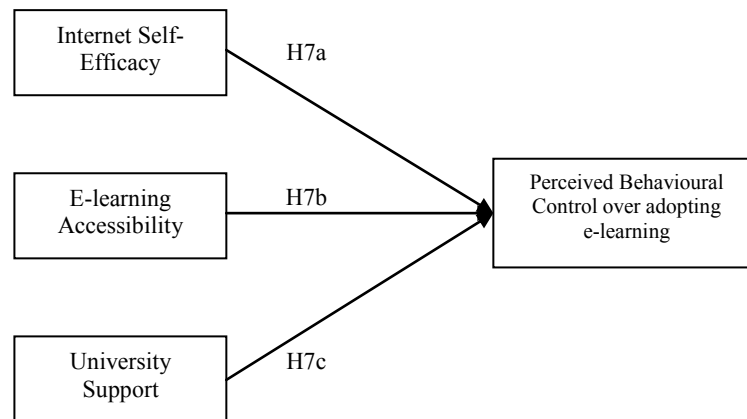


Figure 6-4: Proposed antecedents of PBC

Table 6-8 shows that ISE, PA and US contributed significantly to the explanation of PBC [$F(3, 527) = 61.944, p < .001$]. The three factors explained 30% of variations in students' PBC. Further, the results showed that PA had the greatest effect on PBC ($\beta = .315$), followed by ISE ($\beta = .262$). US was marginally significant ($\beta = .077$). Thus, hypotheses H7a, H7b and H7c were supported.

Table 6-8: Summary of regression analysis for variables explaining PBC

	<i>B</i>	<i>SE</i>	β	<i>t</i>	95% <i>CI</i> for <i>B</i>	
(Constant)	1.861	.283		6.569	1.305	2.418
ISE	.432	.069	.262**	6.306	.298	.567
PA	.343	.046	.315**	7.387	.252	.435
US	.080	.040	.077*	2.001	.001	.158
$R^2 = .261, *p < .05, **p < .001$						

6.4.2 ANSWERING RESEARCH Q2: THE ROLE OF MODERATING VARIABLES

The second question in this study was:

Does gender and Internet Experience moderate the relationships between the three determinants of BI and BIS?

To answer this question, four hypotheses were postulated:

H4a: Gender will moderate the effect of the three determinants of intention on BIS.

H4b: Gender will moderate the effect of the three determinants of intention on BID.

H4c: IE will moderate the effect of the three determinants of intention on BIS.

H4d: IE will moderate the effect of the three determinants of intention on BID.

A moderator variable is “a qualitative (e.g. sex, race, class) or quantitative (e.g., level of reward) variable that affects the direction and/or strength of a relation between an independent or predictor variable and a dependent or criterion variable” (Baron & Kenny, 1986, p.1174). To test the hypotheses that gender and IE moderate the relationships between the three determinants of intentions and BI, the steps suggested by Baron and Kenny (1986) and Aguinis (2004) were followed. Firstly, interaction terms were created by multiplying each of the three determinants by each moderator (Attitude $\times$ gender, SN $\times$ gender, and PBC $\times$ gender; Attitude $\times$ IE, SN $\times$ IE, and PBC $\times$ IE).

In order to reduce the multicollinearity associated with the use of interaction terms, the independent variables were centred before interaction terms were created (Aiken & West, 1991). Next, a series of three-step hierarchical regression analysis was conducted. In the first step, the direct effect of the three determinants (IV) on the DV was assessed. In the second step, the moderator was entered to assess whether the moderator had a significant direct impact on DV. Lastly, in the third step, the interaction terms were entered to assess the additional variance explained. For the moderator effect to be present, the third step must show significant R^2 increase with a significant F -change value. If the interaction term explains a statistically significant amount of variance in the dependent variable, a moderator effect is present (Bennett, 2000).

Carte and Russell (2003) in their review of the IS literature for moderation effects, argued that using the estimated beta of the interaction term as an index of moderation effect size was a common error that may lead to spurious conclusions. They recommended using ΔR^2 to draw conclusions about relative moderator effect sizes. In view of that, the change in R^2 between the first and second models and the moderation model was checked. In this testing approach, the significance of ΔR^2 implies the significance of the interaction terms added to the base model.

6.4.2.1 Gender

The hypothesis that gender moderates the effect of the three determinants of intention on BIS was assessed as described above. Table 6-9 shows that ΔR^2 was nonsignificant ($\Delta R^2=.004$, $F=.911$, ns) indicating that gender did not moderate the relationships between the determinants of intention and BIS. Therefore, hypothesis H4a was not supported.

To test the moderating effects of gender on the relationship between the determinants of intention and BID, another hierarchical multiple regression was run. As shown in table 6-10, ΔR^2 was significant for the interaction terms ($\Delta R^2=.011$, $F = 3.066$, $p < .05$) indicating that gender has moderating effects.

In particular, gender moderates the relationships between PBC and BID. The significant interaction term indicates that the link between BID and PBC is significantly different between the two genders. Therefore, hypothesis H4b was partly supported.

Table 6-9: Results of the examination of the moderating effect of gender on the relationship between A, SN and PBC with BIS

Variable	BIS		
	Step 1	Step 2	Step 3
A	.163**	.168**	.288?
SN	.188**	.184**	-.075
PBC	.210**	.227**	.219?
Gender		.081*	-.093
A × gender			-.201
SN × gender			.410
PBC × gender			.021
R ²	.197	.203	.208
ΔR ²		.006	.004
F-value	43.156**	4.137*	.911
* <i>p</i> < .05, ** <i>p</i> < .001			

Table 6-10: Results of the examination of the moderating effect of gender on the relationship between A, SN and PBC with BID

Variable	BID		
	Step 1	Step 2	Step 3
Attitude	.272**	.262**	.340*
SN	.090*	.095*	.140
PBC	.340**	.325**	.293**
Gender		-.149**	-.133**
Attitude × gender			-.102
SN × gender			-.057
PBC × gender			.114**
R ²	.367	.388	.399
ΔR ²		.022	.011
F-value	101.696**	18.594**	3.066*
* <i>p</i> < .05, ** <i>p</i> < .001			

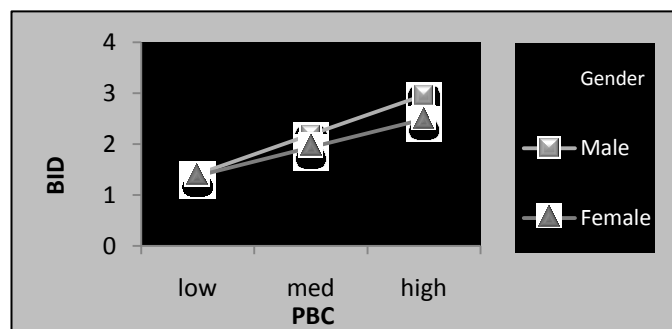


Figure 6-5: The moderation effect of PBC on BID by gender

The form of the interaction was analysed following procedures recommended by Cohen, Cohen, West and Aiken and (2003). Figure 6-5 displays the slopes of the PBC–BID relationships at three levels of PBC. The graph shows that high perceptions of control over adopting e-learning lead to greater intentions to adopt e-learning for

distance education. However, the amount of increase varies between genders. That is, the relationship is stronger for the men than for women.

6.4.2.2 Internet Experience

To gauge the moderating effect of IE on the determinants of intention and BI, hierarchical regression analysis was also performed. Table 6-11 shows that ΔR^2 was significant for the interaction terms attitude $\times$ IE ($\Delta R^2=.020$, $F = 4.542$, $p < .01$) indicating that IE moderates the relationship between attitude and BIS. Therefore, hypothesis H4b was partly supported. Figure 6-6 displays the nature of the relationship.

Table 6-11: Results of the moderating effect of IE on the relationship between A, SN and PBC with BIS

Variable	BIS		
	Step 1	Step 2	Step 3
Attitude	.163**	.167**	.518**
SN	.188**	.186**	-.006
PBC	.210**	.218**	.504**
IE		-.020	.545**
Attitude $\times$ IE			-.668*
SN $\times$ IE			.360
PBC $\times$ IE			-.563
R^2	.197	.198	.218
ΔR^2		.000	.020
F-value	43.156**	.213	4.542**
* $p < .05$, ** $p < .001$			

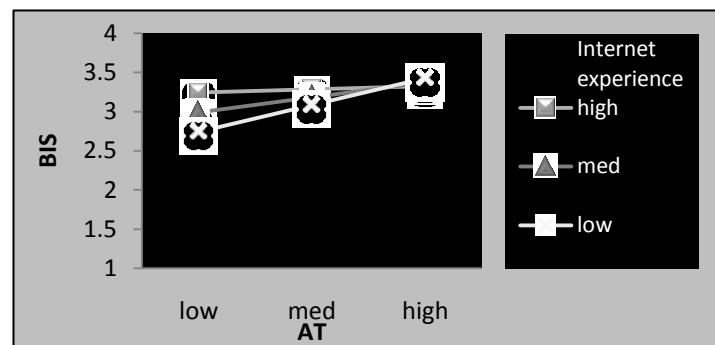


Figure 6-6: The moderation effects of AT on BIS by IE

Figure 6-6 shows the effect of IE on the relationship between attitude and BIS. As attitude become more favourable, intentions to adopt e-learning as a supplementary tool increase. This relationship is mostly pronounced for the students who have low levels of IE.

To assess the moderating role of IE on the effects of attitude, SN and PBC on BID, a three-step hierarchical regression analysis was also conducted. Table 6-12 displays that ΔR^2 is significant for the interaction term PBC $\times$ IE ($\Delta R^2=.010$, $F = 2.862$, $p < .05$) indicating that IE moderates the relationships between PBC and BID. Therefore, hypothesis H4c was partly supported.

Table 6-12: Results of the moderating effect of IE on the relationship between A, SN and PBC with BID

Variable	BID		
	Step 1	Step 2	Step 3
Attitude	.272**	.252**	.286**
SN	.090*	.100*	.055
PBC	.340**	.306**	.280**
IE		.116**	-.046
Attitude $\times$ IE			-.084
SN $\times$ IE			.051
PBC $\times$ IE			.227**
R^2	.367	.378	.388
ΔR^2		.012	.010
F-value	101.696**	9.752**	2.862*
* $p < .05$, ** $p < .001$			

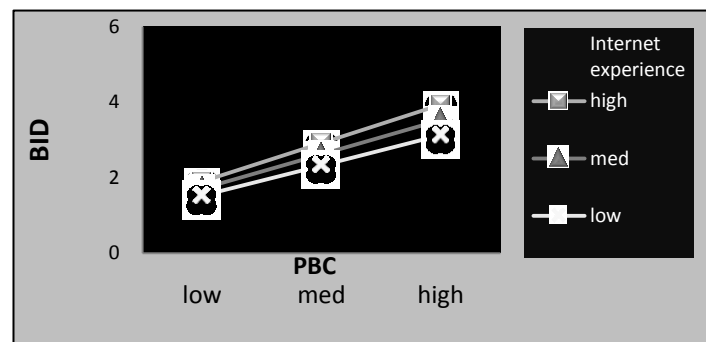


Figure 6-7: The moderation effects of PBC on BID by IE

Figure 6-7 illustrates the effect of IE on the relationship between PBC and BID. As perceptions of control over adopting e-learning increase, students' intentions to adopt e-learning for distance education increase. The relationship depends on the level of IE, i.e. this relationship is more salient for experienced students.

6.4.3 ANSWERING RESEARCH Q3: THE ROLE OF MEDIATING VARIABLES

The third question in this research was:

Do the three determinants of BI mediate the relationships between their underlying salient beliefs and BIS and BID?

The question investigates whether the three constructs (i.e. attitude, SN and PBC) have a mediating effect. That is, they have an intervening effect that explains why and how the relationships between BI and the salient beliefs exist (Bryman & Cramer, 2001). Mediation explains how or why two variables are related (MacKinnon, 2008). A variable may be termed as a mediator "to the extent that it accounts for the relation between the predictor and the criterion" (Baron & Kenny, 1986, p. 1176). According to Baron and Kenny (1986), a variable is a mediator when it meets the following conditions: (a) variations in levels of the independent variable significantly account for variations in the presumed mediator, (b) variations in the mediator significantly account

for variations in the dependent variable, and (c) in the presence of a significant relationship between the mediator and the dependent variable, a previously significant relationship between the independent and dependent variables is no longer significant. Complete mediation is the case when the independent variable no longer affects the criterion after the mediator has been controlled and the path between the independent and dependent is zero. Partial mediation is the case when the path from the independent to dependent is reduced in absolute size but is still different from zero when the mediator is controlled (Kenny, 2008).

Six hypotheses were postulated detailing the possible role of attitude, SN and PBC as mediator variables between BIS and BID and the antecedents of attitude, SN and PBC.

H5e: Attitude will mediate the link between the attitudinal beliefs and BIS.

H5f: Attitude will mediate the link between the attitudinal beliefs and BID.

H6d: SN will mediate the link between the normative beliefs and BIS.

H6e: SN will mediate the link between the normative beliefs and BID.

H7d: PBC will mediate the link between the control beliefs and BIS.

H7e: PBC will mediate the link between the control beliefs and BID.

To assess mediation effects of attitude, SN and PBC, the procedures suggested by Baron and Kenny (1986) and James and Brett (1984) to assess mediation were followed.

6.4.3.1.1 Attitude

In assessing the mediation effects of attitude on the relationship between the three attitudinal beliefs and BIS, table 6-13 shows that the four attitudinal beliefs were significantly correlated with BIS. In addition, attitude was significantly correlated with BIS. However, when attitude and the four attitudinal beliefs were regressed against BIS, the significant effect of PEOU, PF and PI became insignificant thus suggesting a full mediation relationship. PU was still a significant predictor of BIS in the presence of attitude but its beta weight decreased in size, which indicated a partial mediation.

Table 6-13: Results for the mediating effect of attitude on the links between BIS and attitudinal beliefs

<i>Dependent variable</i>		<i>Independent variables</i>				<i>Mediator</i>	<i>R²</i>	<i>F value</i>
BIS		PU	PEOU	PF	PI	Attitude		
	without mediator	.434*	.349*	.296*	.287*	.358*	.193	31.449*
	with mediators	.340*	.055	-.010	-.034	.140*	.203	26.825*

* $p < .001$

Additionally, there was an increase in R^2 that is explained by the mediation effect of attitude. The Sobel tests indicated that the mediation effect was significant ($Z_{\text{Sobel}} = 2.9, 4.3, 5.5, 5.5, p < .05$, for PU, PEOU, PF and PI respectively). Thus, hypothesis *H5e* was supported.

Table 6-14 shows that the attitudinal beliefs were correlated significantly with BID. There was also a significant correlation between attitude and BID. When attitude and the four beliefs were regressed against BID, the beta weights of PU, PEOU, PF and PI dropped substantially. Besides, there was an increase in R^2 that is explained by the mediation effect of attitude. Sobel tests indicated that the amount of mediations was significant ($Z_{Sobel} = 5.6, 5.9, 6.6, 6.8, p < .05$, for PU, PEOU, PF and PI respectively). Thus, attitude mediated partially the relationship between PU, PEOU, PF and PI and BID. Therefore, hypothesis H5f was supported.

Table 6-14: Results for examining the mediating effect of attitude on the links between BID and attitudinal beliefs

<i>Dependent variable</i>		<i>Independent variables</i>				<i>Mediator</i>	R^2	<i>F value</i>
BID		PU	PEOU	PF	PI	Attitude		
	without mediator	.602*	.577*	.613*	.578*	.526*	.486	124.204*
	with mediators	.144*	.139*	.263*	.173*	.126*	.494	102.643*

* $p < .001$

6.4.3.1.2 Subjective Norm

In assessing the mediation effects of SN on the relationship between the normative beliefs and BIS, table 6-15 demonstrates that the normative beliefs were correlated with BIS. Moreover, SN was correlated with BIS. When SN was included in the regression analysis with the normative beliefs to predict BIS, the beta weights of the independent variables dropped considerably. Additionally, there was an increase in R^2 that is explained by the mediation effect of SN. Sobel tests indicated that the amount of mediation was significant ($Z_{Sobel} = 4.2, 5.2, 4.9, p < .05$ for PB, FB and IB respectively). Thus, SN seems to mediate the relationship between the three normative beliefs and BIS. Thus, hypothesis H6d was supported.

Table 6-15: Results for examining the mediating effect of SN on the links between BIS and normative beliefs

<i>Dependent variable</i>		<i>Independent variables</i>			<i>Mediator</i>	R^2	<i>F value</i>
BIS		PB	FB	IB	SN		
	without mediator	.284**	.110**	.229**	.356**	.229	52.191**
	with mediators	.222**	.085*	.213**	.154**	.246	42.903**

* $p < .05$, ** $p < .01$

For BID, table 6-16 shows that all three normative beliefs were significantly correlated with BID. Moreover, SN was significantly correlated with BID. When the independent variables and possible mediator regressed against BID, PB and FB appeared to be mediated partially by SN while IB seemed to be fully mediated by SN. Sobel tests showed that the amount of the mediation was significant ($Z_{Sobel} = 4.6, 5.5, 5.8, p < .05$ for PB, FB and IB respectively). Thus, hypothesis H6e was also supported.

Table 6-16: Results for examining the mediating effect of SN on the links between BID and normative beliefs

<i>Dependent variable</i>		<i>Independent variables</i>		<i>Mediator</i>		<i>R²</i>	<i>F value</i>
		PB	FB	IB	SN		
BID	without mediator	.520*	.363*	.228*	.416*	.321	83.003*
	with mediators	.391*	.208*	-.035	.169*	.341	68.168*

* $p < .01$

6.4.3.1.3 PBC

In order to assess the mediation effect of PBC, table 6-17 shows that the independent variables were significantly correlated with BIS. Moreover, PBC was significantly correlated with BIS. However, when all control beliefs and PBC were regressed against BIS, the values of the beta coefficients for all control factors shrank and the coefficient of determination increased. Such a change is explained by the inclusion of PBC in the regression equation. Sobel tests showed that the amount of mediation was significant ($Z_{\text{Sobel}} = 5.5, 5.1, 5.3, p < .05$ for ISE, PA and US respectively). Hence, PBC mediated partially the relationship between BIS and the three control beliefs. Thus, hypothesis H7d was supported.

Table 6-17: Results for examining the mediating effect of PBC on the links between BIS and control beliefs

<i>Dependent variable</i>		<i>Independent variables</i>			<i>Mediator</i>	<i>R²</i>	<i>F value</i>
		ISE	PA	US	PBC		
BIS	without mediator	.186**	.268**	.260**	.324**		
	with mediators	.028	.106*	.189**	.232**	.158	65.307**

* $p < .05$, ** $p < .01$

Table 6-18 shows the results of the analysis of the mediation effect of PBC on the link between the control beliefs and BID. From the table, it can be seen that all independent variables were significantly correlated with BID. The mediator was also significantly correlated with BID. When PBC included in a regression analysis in which the control factors were regressed against BID, the beta weight values dropped thus indicating a mediation effect. The analysis shows that PBC partially mediated the relationship between ISE and BID while fully mediated the relationships between PA and US with BID. Overall, the reduction due to PBC was significant as indicated by Sobel tests ($Z_{\text{Sobel}} = 7.9, 8.3, 4.0, p < .05$ for ISE, PA and US respectively). Thus, hypothesis H7e was supported.

Table 6-18: Results for examining the mediating effect of PBC on the links between BID and control beliefs

<i>Dependent variable</i>		<i>Independent variables</i>			<i>Mediator</i>	<i>R²</i>	<i>F value</i>
		ISE	PA	US	PBC		
BID	without mediator	.222**	.218**	.148**	.414**	.183	39.367**
	with mediators	.130*	.078	.024	.273**	.332	39.367**

* $p < .05$, ** $p < .01$

6.4.4 ANSWERING RESEARCH Q4: DIFFERENCES BETWEEN STUDENTS IN THEIR BI

This research sought to uncover differences between the students in their BI to adopt e-learning based on selected demographic variables:

Do the students differ in their BIS and BID based on selected demographics?

The demographic variables investigated in this study were gender, mode of study, place of residence, job and family responsibilities, faculty, the type of internet connection and internet experience.

In answering the fourth question, a number of null hypotheses were tested. In order to test the hypotheses, *t*-test, Mann-Whitney *U* test, one-way *ANOVA* and Kruskal–Wallis *H* test were used. The selection of the appropriate statistics was based on the distribution of the dependent variable as well as on the number of the groups being compared.

6.4.4.1 Gender

H8.1a There is no difference in BIS between the male and female students.

For this null hypothesis, the Mann-Whitney *U* test was used. The mean score of BIS for males ($M = 5.57$, $SD = 1.34$) was very close to the mean score of females ($M = 5.58$, $SD = 5.58$). Table 6-19 shows this difference to be non-significant: $z = -.187$, $p > .05$ (two-tailed). Thus, this hypothesis was supported.

Table 6-19: Results of Mann-Whitney *U* test for gender differences in BIS

	<i>Male</i> (<i>N</i> =209)			<i>Female</i> (<i>N</i> =321)			<i>Mann</i> <i>Whitney U</i>	<i>z</i>
	Mean Rank	M	SD	Mean Rank	M	SD		
BI to adopt e-learning as a supplementary tool (BIS)	263.97	5.5	1.3	266.50	5.5	1.3	33224.500	-.187

H8.1b There is no difference in BID between the male and female students.

For this null hypothesis, a *t*-test was performed. The mean score of the male students ($M = 5.5$, $SD = 1.6$) was higher than those of female students ($M = 4.6$, $SD = 1.9$). As Table 6-20 shows, the *t*-statistic is $t(504.277) = 5.533$, $p < .05$ (two-tailed). Hence, a significant difference found in BID between male and female students and the null hypothesis was not supported. Cohen's *d* is 0.48, which is a medium effect according to Cohen (1988).

Table 6-20: Results of *t*-test for gender differences in BID

	<i>Male</i> (<i>N</i> =209)		<i>Female</i> (<i>N</i> =321)		<i>t</i> [†]
	M	SD	M	SD	
BI to adopt e-learning for distance education (BID)	5.4	1.6	4.6	1.9	5.533*
* <i>p</i> < .001, [†] Because Levene's <i>F</i> was statistically significant (<i>p</i> < .05), the "equal variances not assumed" <i>t</i> was used for BID					

6.4.4.2 Mode of study

H8.2a There is no difference in BIS between students of the different modes of study.

For this null hypothesis, the Mann-Whitney *U* test was performed. Table 6-21 indicates that the full-time students (*M* = 5.5, *SD* = 1.3) did not seem to differ from part-time students in their BIS (*M* = 5.4, *SD* = 1.3), *z* = -.906, *p* > .05 (two-tailed). The null hypothesis was thus supported.

Table 6-21: Results of MW U test for mode of study differences in BIS

	<i>Full-time</i> (<i>N</i> =447)			<i>Part-time</i> (<i>N</i> =83)			<i>Mann-Whitney U</i>	<i>z</i>
	Mean Rank	M	SD	Mean Rank	M	SD		
BI to adopt e-learning as a supplementary tool (BIS)	268.08	5.5	1.3	251.62	5.4	1.3	17398.500	-.906

H8.2b There is no difference in BID between students of the different modes of study.

To test this null hypothesis, a *t*-test was carried out. Table 6-22 shows that there is a significant difference found in BID between full-time students (*M* = 4.7, *SD* = 1.9) and part-time students (*M* = 6.3, *SD* = 1), *t* (207.071) = -11.015, *p* < .05 (two-tailed). Cohen's *d* is -1.03, which is a large effect according to Cohen (1988). Hence, the null hypothesis was not supported.

Table 6-22: Results of *t*-test for mode of study differences in BID

	<i>Full-time</i> (<i>N</i> =447)		<i>Part-time</i> (<i>N</i> =83)		<i>t</i> [†]
	M	SD	M	SD	
BI to adopt e-learning for distance education (BID)	4.7	1.9	6.3	1	-11.015*
* <i>p</i> < .001, [†] Because Levene's <i>F</i> was statistically significant (<i>p</i> < .05), the "equal variances not assumed" <i>t</i> was used for BID					

6.4.4.3 Place of residence

H8.3a There is no difference in BIS between students of the different places of residence.

For this null hypothesis, the Mann-Whitney U test was performed. As shown in table 6-23, urban students ($M = 5.6$, $SD = 1.3$) did not seem to differ from rural students in BIS ($M = 5.4$, $SD = 1.3$), $z = -1.337$, $p > .05$ (two-tailed). Therefore, this hypothesis was supported.

Table 6-23: Results of MW U for place of residence differences in BIS

	<i>Urban</i> (<i>N</i> =405)			<i>Rural</i> (<i>N</i> =117)			<i>Mann-Whitney U</i>	<i>z</i>
	Mean Rank	M	SD	Mean Rank	M	SD		
BI to adopt e-learning as a supplementary tool (BIS)	266.21	5.6	1.3	245.21	5.4	1.3	21786.000	-1.337

H8.3b There is no difference in BID between students of the different places of residence.

To test this null hypothesis, a t -test was used. As table 6-24 shows, there is a significant difference found in BID [$t(520) = -2.485$, $p < .05$ (two-tailed)] between urban students ($M = 4.8$, $SD = 1.9$) and rural ($M = 5.3$, $SD = 1.7$). As a result, the hypothesis was not supported. Rural students seemed to show higher intentions to adopt e-learning for distance education. However, Cohen's d is 0.26, which is a small effect (Cohen, 1988).

Table 6-24: Results of t -test for place of residence differences in BID

	<i>Urban</i> (<i>N</i> =405)		<i>Rural</i> (<i>N</i> =117)		<i>t</i> [†]
	M	SD	M	SD	
BI to adopt e-learning for distance education (BID)	4.8	1.9	5.3	1.7	-2.485*
* $p < .05$, [†] Because Levene's F was not significant, t was used for BID					

6.4.4.4 Job responsibilities

H8.4a There is no difference in BIS between students with or without a job.

For this null hypothesis, a t -test was performed (table 6-25). There is no significant difference found in BIS between students with job ($M = 5.5$, $SD = 1.3$) or without ($M = 5.6$, $SD = 1.2$), $z = -.001$, $p > .05$ (two-tailed)]. Accordingly, the null hypothesis was supported.

Table 6-25: Results of Mann-Whitney *U* for Job status differences in BIS

	<i>With Job</i> (<i>N</i> =400)			<i>Without job</i> (<i>N</i> =125)			<i>Mann-Whitney U</i>	<i>z</i>
	Mean Rank	M	SD	Mean Rank	M	SD		
BI to adopt e-learning as a supplementary tool (BIS)	263.01	5.5	1.3	262.98	5.6	1.2	24998.000	-.001

H8.4b There is no statistically significant difference in BID between students with or without a job.

For this null hypothesis, a *t*-test was performed. Table 6-26 shows that there is a significant difference in BID between students with or without job [$t(234.679) = -5.876, p < .05$ (two-tailed)]. Thus, the null hypothesis was not supported. Cohen's *d* is 0.8, which is a large size effect (Cohen, 1988).

Table 6-26: Results of *t*-test for Job status differences in BID

	<i>With Job</i> (<i>N</i> =400)		<i>Without job</i> (<i>N</i> =125)		<i>t</i> [†]
	M	SD	M	SD	
BI to adopt e-learning for distance education (BID)	4.7	1.9	5.7	1.6	-5.876*
* $p < .05$, [†] Because Levene's <i>F</i> was statistically significant ($p < .05$), the "equal variances not assumed" <i>t</i> was used for BID					

6.4.4.5 Family responsibilities

H8.5a There is no difference in BIS between students with or without family responsibilities.

A Mann-Whitney *U* test was performed to test this null hypothesis. The mean score of the students who have family responsibilities ($M = 5.5, SD = 1.4$) was very close to the mean score of those who did not have family responsibilities ($M = 5.6, SD = 1.2$). Table 6-27 shows that there is no statistically significant difference in BIS between the two groups, $z = -.041, p > .05$ (two-tailed). Thus, the null hypothesis was supported.

Table 6-27: Results of MW *U* for family responsibility difference in BIS

	<i>With family responsibilities</i> (<i>N</i> =369)			<i>Without family responsibilities</i> (<i>N</i> =145)			<i>Mann-Whitney U</i>	<i>z</i>
	Mean Rank	M	SD	Mean Rank	M	SD		
BI to adopt e-learning as a supplementary tool (BIS)	257.33	5.5	1.4	257.92	5.6	1.2	26691.500	-.041

H8.5b There is no difference in BID between students with or without family responsibilities.

For this null hypothesis, a *t*-test was performed. There was a significant difference found in BID between students with or without family responsibilities (table 6-28). [$t(315.677) = -5.357, p < .05$ (two-tailed)]. Hence, the null hypothesis was not supported. Cohen's *d* is 0.503, which is a medium effect size (Cohen, 1988).

Table 6-28: Results of *t*-test for family responsibility difference in BID

	<i>With family responsibilities</i> (N=369)		<i>Without family responsibilities</i> (N=145)		<i>t</i> [†]
	M	SD	M	SD	
BI to adopt e-learning for distance education (BID)	4.7	1.9	5.6	1.6	-5.357*
* $p < .001$, [†] Since <i>F</i> was statistically significant ($p < .05$), the "equal variances not assumed" <i>t</i> was used for BID					

6.4.4.6 Faculty

H8.6a There is no difference in BIS between the students of the different faculties.

As some of the faculties were only represented by a few students, it was decided to recode the 'faculty' variable into a dichotomous variable that is 'main faculty'. The first category of this new variable was termed Humanity and it included the faculties of Arts, Home Economics and Economics and Administration. The second category was termed Science and it included the colleges of Computer Sciences and Informatics, School of Medicine and Medical Sciences and the College of Science.

To test the hypothesis, a Mann-Whitney *U* test was performed. Table 6-29 indicates that the mean score of BIS for the students in the Humanity Faculties ($M = 5.6$, $SD = 1.3$) was very close to the mean score of the students of the Scientific Faculties ($M = 5.5$, $SD = 1.4$). There is no significant difference between the two groups: $z = -.667, p > .05$ (two-tailed). Thus, this hypothesis was supported.

Table 6-29: Results of Mann-Whitney *U* for faculty differences in BIS

	<i>Humanities</i> (N=393)			<i>Sciences</i> (N=138)			<i>Mann-Whitney U</i>	<i>z</i>
	Mean Rank	M	SD	Mean Rank	M	SD		
BI to adopt e-learning as a supplementary tool (BIS)	268.61	5.6	1.3	258.57	5.5	1.4	26091.000	-.667

H8.6b There is no difference in BID between the students of the different faculties.

For this null hypothesis, a *t*-test was also performed (table 6-30). It was found that there is a significant difference in BID between students from the different majors. [$t(529) = 2.162, p < .05$ (two-tailed)]. Therefore, the null hypothesis of no difference was not supported. Cohen's *d* is 0.216 and this is considered small effect size (Cohen, 1988).

Table 6-30: Results of *t*-test for faculty differences in BID

	<i>Humanities</i> (<i>N</i> =393)		<i>Sciences</i> (<i>N</i> =138)		<i>t</i> [†]
	M	SD	M	SD	
BI to adopt e-learning for distance education (BID)	5	1.9	4.6	1.8	2.162*
* $p < .001$, [†] Since <i>F</i> was not significant ($p < .05$), the "equal variances assumed" <i>t</i> was used for BID					

6.4.4.7 Type of internet connection

H8.7a There is no difference in BIS between the students with different types of internet connection.

For this null hypothesis, a *Kruskal-Wallis* test was conducted. As table 6-31 indicates, the Kruskal-Wallis chi-square test is not significant, $\chi^2(4) = .653, p > .05$ (two-tailed). As such, there is no significant difference found in BIS between students with the different internet connection types. Thus, the null hypothesis of no difference between the students based on the type of internet connection they possessed is supported.

Table 6-31: Results of Kruskal Wallis for the type of internet connection differences in BIS

<i>Group</i>	<i>N</i>	<i>Rank</i>	χ^2	<i>df</i>	<i>Asymp. Sig.</i>	99% CI	
						<i>Lower Bound</i>	<i>Upper Bound</i>
Dial up	187	264.40					
DSL	287	266.63					
Satellite	18	291.36	.653	4	.957	.952	.963
Wireless	29	257.02					
No connection	10	258.20					
Total	531						

H8.7b There is no difference in BID between the students with different types of internet connection.

For this null hypothesis, a one-way between-groups *ANOVA* was conducted. Table 6-33 shows that there is a significant difference found in BID between students

with the different types of internet connection [$F(4, 40.545) = 8.428, p < .05$]. In order to find out where that significant difference was, the Games-Howell procedure was used (Field, 2009). Table 6-34 shows the *post-hoc* comparisons using the Games-Howell procedure.

The results in Table 6-32 revealed that there was a significant difference between the students in the groups of dial-up ($M = 4.5, SD = 2.1$) and DSL connections ($M = 5.3, SD = 1.7$). In addition, there was a significant difference between those who owned DSL connection and those who reported no internet connection ($M = 3.5, SD = 1.6$). On the other hand, the other groups showed no significant differences between themselves. The effect size was $\eta^2 .063$, which is regarded a small effect size according to Cohen (1988). Therefore, the null hypothesis that there is no difference between the students with the different types of internet connection was not supported.

Table 6-32: Descriptive statistics for BID for groups (different internet connection)

	<i>N</i>	<i>M</i>	<i>SD</i>	<i>Std. Error</i>
Dial-up	187	4.4	2.1	.15305
DSL	287	5.3	1.6	.09756
Satellite	18	5.4	1.7	.42251
Wireless	29	4.3	2.1	.38074
No connection	10	3.5	1.6	.52705
Total	531	4.9	1.8	.08245

Table 6-33: Results of *ANOVA* for internet connection differences in BID

	<i>Sum of Squares</i>	<i>Mean Square</i>	<i>df (for Welch F)</i>	<i>Welch F</i>	<i>F</i>	η^2
Between Groups	119.943	29.986	4	8.428*	8.795*	.063
Within Groups	1793.340	3.409	40.545			
Total	1913.283					
* $p < .001$						

Table 6-34: Games-Howell *post-hoc* for internet connection

	<i>Mean Difference</i>	<i>Std. Error</i>	<i>95% CI</i>	
			<i>Upper Bound</i>	<i>Lower Bound</i>
Dial up vs. DSL	-.84756*	.18150	-1.3454	-.3497
Dial up vs. Satellite	-.91754	.44937	-2.2523	.4172
Dial up vs. Wireless	.18878	.41035	-.9866	1.3642
Dial up vs. No connection	.99913	.54882	-.7882	2.7864
DSL vs. Satellite	-.06998	.43363	-1.3750	1.2350
DSL vs. Wireless	1.03635	.39304	-.0997	2.1724
DSL vs. No connection	1.84669*	.53600	.0694	3.6240
Satellite vs. Wireless	1.10632	.56875	-.5183	2.7310
Satellite vs. No connection	1.91667	.67549	-.1054	3.9387
Wireless vs. No connection	.81034	.65018	-1.1432	2.7639
* $p < .05$				

6.4.4.8 Internet Experience

H8.8a There is no difference in BIS between the students of the different IE.

To test this null hypothesis, a Kruskal-Wallis test was conducted. Table 6-35 indicates that there was a significant difference between the students of the three levels in their BI to adopt e-learning to supplement their study, $\chi^2 (2) = 8.552$, $p < .05$ (two-tailed). Thus, the null hypothesis was not supported. Despite reaching statistical significance, however, the effect size of the difference between the students of the different experience levels, calculated using η^2 was .017, which is considered small (Cohen, 1988). *Post-hoc* comparisons using Mann-Whitney *U* tests were used to follow up this finding (Table 6-36). A Bonferroni correction was applied to ensure that Type I errors do not build up to more than .05 (Field, 2009). This was achieved by using the critical value of .05 divided by the number of tests conducted. In this case, the critical value becomes $.05/3 = 0.0167$. Accordingly, all effects are reported at a 0.0167 level of significance. It appeared that BIS was not different for students with little experience and average experience ($z = -1.843$, $r = -0.14$). Similarly, there was no difference between the students with high experience and average experience ($z = -1.389$, $r = -0.06$). However, there was a significant difference between the students with little experience and those with high experience, yet the effect size was small according to Cohen (1988) ($z = -2.774$, $r = -0.14$).

Table 6-35: Results of Kruskal Wallis for IE differences in BIS

<i>Group</i>	<i>N</i>	<i>Rank</i>	χ^2	<i>df</i>	<i>Asymp. Sig.</i>	<i>99% CI</i>	
						<i>Lower Bound</i>	<i>Upper Bound</i>
Little experience	36	203.00	8.552*	2	.014	.011	.017
Average experience	146	255.86					
High experience	349	276.74					
Total	531						
* $p < .05$							

Table 6-36: *Post hoc* Mann-Whitney *U* comparisons for IE differences in BIS

<i>Groups</i>	<i>N</i>	<i>Mean Rank</i>	<i>Sum of Ranks</i>	<i>Mann-Whitney U</i>	<i>z</i>
Little experience vs. Average experience	36	77.10	2775.50	2109.500	-1.843
Little experience vs. High experience	36	144.40	5198.50	4532.500	-2.774*
Average experience vs. High experience	146	234.31	34209.00	23478.000	-1.389
High experience	349	253.73	88551.00		
* $p < .001$					

H8.8b There is no difference in BID between the students of the different IE.

In order to test this null hypothesis, a one-way between-groups *ANOVA* was performed. The results in table 6-38 show that there was a significant difference found in BID between students with the different levels of IE [$F(2, 89.501) = 17.887, p < .05$]. *Post-hoc* comparisons using the Games-Howell procedure in table 6-39 revealed that there was a significant difference between the students who have little experience ($M = 3.8, SD = 2$) and those who have high experience ($M = 5.3, SD = 1.7$). In addition, there was a significant difference between those who have average experience ($M = 4.4, SD = 1.9$) and those who have high experience. Therefore, the null hypothesis was not supported. The effect size of this difference was $\eta^2 = .07$, which is regarded small according to Cohen (1988). Further, there was no significant difference between the mean scores of the little and average experience groups.

Table 6-37: Descriptive statistics for BID for groups (different levels of IE)

	<i>N</i>	<i>M</i>	<i>SD</i>	<i>Std. Error</i>
Little	36	3.8	2	.34366
Average	146	4.3	1.9	.16013
High	349	5.3	1.7	.09467
Total	531	4.9	1.8	.08245

Table 6-38: Results of *ANOVA* for the level of IE in BID

	<i>Sum of Squares</i>	<i>Mean Square</i>	<i>df (Welch F)</i>	<i>Welch F</i>	<i>F</i>	η^2
Between Groups	133.075	66.537	2	17.887*	19.735*	.07
Within Groups	1780.208	3.372	89.501			
Total	1913.283					
* $p < .001$						

Table 6-39: Results of Games-Howell *post-hoc* comparisons for types of IE

	<i>Mean Difference</i>	<i>Std. Error</i>	<i>95% CI</i>	
			<i>Upper Bound</i>	<i>Lower Bound</i>
Little vs. Average	-.53161	.37913	-1.4467	.3835
Little vs. High	-1.44834*	.35646	-2.3155	-.5812
Average vs. High	-.91673*	.18602	-1.3553	-.4782
* $p < .001$				

6.5 RESULTS OF THE SEMI-STRUCTURED INTERVIEWS

A series of semi-structured interviews were conducted with six students to shed light on the unexpected results. The questions in the semi-structured interviews were derived from the main quantitative study.

6.5.1 PARTICIPANTS' DEMOGRAPHICS

Six students were chosen to participate in the subsequent phase of the study. A purposeful sampling method was employed to select them. This method was chosen because it was essential to ensure the presence of some demographic characteristics of the students in order to address the interview questions. Accordingly, participants were approached based on their demographics. Table 6-40 shows their demographics.

Table 6-40: Demographics of participants

Demographics	n
Gender	Male
	2
Mode of study	Female
	4
Place of residence	Full-time
	4
Job	Part-time
	2
Family responsibility	Urban
	4
Faculty	Rural
	2
	Yes
	3
	No
	3
	Yes
	4
	No
	2
	Arts
	3
	Economics and Administration
	1
	Science
	2

6.5.2 GENDER

The results of the quantitative phase have revealed that the students differed in their BID. Particularly, the male students were more inclined to adopt e-learning than the female students. In order to get more insight of this result, the following question was asked:

In your opinion, why did male students show greater intentions to adopt e-learning for distance education than the female students?

Some students revealed that the female students were less interested in adopting e-learning for distance education because their families, out of fear from the unsafe aspects of the internet, might not allow them to use the internet or more accurately restrict their access to the internet, which is the backbone of e-learning. For example, one student explained that such difference in intention is due to the fact that: *"...some families restrict the girls' usage of the internet"* (an urban full-time female student).

In the same way, another student expressed a similar view,

"...It is possible that the girl might be interested in such a method but she knows that it will not be easy for her to study using the internet, I mean her family may object to the internet." (an urban part-time female student).

Moreover, some female students indicated that adopting e-learning as a way of learning, would minimise their chance of socialising, which occurs within the traditional face-to-face learning contexts.

“...probably, some students think that e-learning will decrease their chances of getting to meet more friends, since it does not require attendance.” (an urban full-time female student).

“Going out and mingling with other students is not part of e-learning environments. Thus, we have preference for face-to-face education” (an urban full-time female student).

Some students also indicated that male students think of e-learning as a *“time-saver”* as opposed to the traditional mode of learning which was described as *“time-consuming”* by one male student. E-learning can thus allow them to *“perform more than one task to meet life’s demands”* (an urban part-time female student).

Another rural full-time male student also revealed that male students usually have many responsibilities and e-learning can be *“...a good alternative to the daily commute to the campus which wastes a lot of their precious time and money.”*

Moreover, one female student mentioned that e-learning might be thought of as an easier way of learning and thus attracts male students more.

6.5.3 MODE OF STUDY

The questionnaire results also showed that the full-time and intisab (i.e. part-time) students were not equal in their BID. The second question in the interview schedule was:

In your view, why did the intisab students favour the adoption of e-learning for distance education more than the full-time students did?

In responding to this question, all students stressed that e-learning allows the intisab students, who most of the time have other commitments, to maintain their duties. For instance, an urban female part-time student responded:

“...probably external (part-time) students are married with little children just like me or working in the morning, which makes e-learning an easier way of taking a degree in such circumstances.”

In addition, all the students agreed that it is the intisab students’ need to communicate with their tutors and other students via e-learning tools that makes this educational technology more attractive to the intisab students. E-learning is perceived by the students as an interactive educational technology. For example, a male part-time student expressed this view:

“...it appeals to us (the intisab) probably more than the full-time students because in our case there is no direct and constant communication or interaction between the external student and other learners and instructors”.

6.5.4 PLACE OF RESIDENCE

The results of the quantitative data revealed a difference between the students from the different places of residence in their BID. Specifically, the students who came from outside the city were more likely to adopt e-learning than their urban peers. The third question was designed to uncover the reasons for this result:

In your viewpoint, why did the students who come from outside the city favour the adoption of e-learning for distance education more than the students who reside in the city?

There was almost an agreement among the students regarding the main reason for rural students having a stronger intent to adopt e-learning. E-learning dispenses with the problems of commuting to and from the university located in the city centre. In addition, in the absence of reliable transport linking the city with the villages, e-learning can be regarded as a good way of accessing higher education. One rural male student expressed this lucidly:

“I am among those students who leaves in the early morning or dawn and comes back at late times when most of the day has gone, this is absolutely tiring... e-learning will of course, provide us with a better solution to this ‘tragedy’ and saves our day”.

Another rural full-time female student said:

“...my village is about 250 km from Jeddah and I come with my cousins in a mini-bus every day leaving with the sunrise...e-learning will transcend the obstacles for the rural students, distances particularly”.

6.5.5 FACULTY

The fourth question revolved around the difference between the students in their intent to adopt e-learning for distance education based on their faculty. The faculties were split into two groups, the Sciences and the Humanities. The students in the Humanities showed stronger agreement towards the adoption of e-learning for distance education than the Sciences Faculty students. The question posed was:

In your opinion, why did the students from the Humanities show a greater liking for the adoption of e-learning for distance education than the students from the Sciences?

There was consensus among the students that the nature of the subject matter of these faculties was the main factor in differentiating between the students of the

different faculties. The students from the Scientific faculties need to experiment and apply what they learn more than the students from the Humanities do.

“The Humanities require understanding theories but in the Scientific faculties we need to experiment, apply and infer from the testing and applications of scientific subject-matters.... This is not feasible sometimes via the internet alone” (an urban full-time male student).

Another student commented:

“...for the students in the School of Medicine, it is not possible to study anatomy online even if there is great software for this purpose” (an urban full-time female students)

6.5.6 JOB RESPONSIBILITIES

The results showed that the students who had job responsibilities showed less liking for the adoption of e-learning for distance education than those without job obligations. As such, the following question was asked:

In your opinion, why did the students who reported having job responsibilities show less liking for the adoption of e-learning for distance education than those who did not have such obligations?

Some of the interviewed students emphasised that adopting e-learning for distance education requires a certain degree of commitment and time-management skills that might be difficult for working students especially in the context of a long history of traditional and dependent styles of learning which characterises the Saudi context. One student expressed this view:

“I think in the traditional education, the instructor organises the track of the learning process, I mean when to study this part, when to review, when to assess what have been covered and this alleviates some of the burden from the student... For working students who are busy, such a traditional way keeps them on track.... E-learning is not suitable in my opinion because everything is left to the student who cannot organise his studies due to his job commitments...” (an urban full-time female student).

Saudi students still prefer instructor-led learning that is studying with a real instructor to learning from a virtual teacher (such as the case in e-learning distance education). They are accustomed to education in the structured system owing to the conventional norms of education.

The students also indicated that having job responsibilities in itself deters students from benefiting from such a technology. For example, one student commented:

“If the student is already busy with other things, she might postpone studying and submitting her assignments for the sake of her job and hence cannot control her time as she might do in the traditional education” (an urban part-time female student).

6.5.7 FAMILY RESPONSIBILITIES

The sixth question was: *In your opinion, why did the students who reported having family responsibilities show less liking for the adoption of e-learning for distance education than those who did not have such a commitment?*

All the interviewed students agreed that it is the time factor and the type of obligation that makes it difficult for the students who have family commitments to think of e-learning as a suitable method for education. For example, taking care of children is “a time-consuming task” as one female student expressed. She commented:

“...Imagine a mother who wants to listen to an online lecture and her kids want to eat or sleep. They will interrupt her constantly... but if she attends the daily lectures and leave her kids in a secure place she will not be interrupted in such a way and will be able to devote some time to study” (a rural full-time female student).

Another female student added,

“...in the Saudi society, family comes first and if the wife or the mother has the chance to study at home; in a little while, her domestic chores will prevail over her studies...” (an urban full-time female student).

Likewise, another student commented:

“...some families will not consider sitting on the monitor a ‘real learning’, thus they will not accept postponing some chores or leave her kids alone to sit on the computer, but if she goes to the university, believe me it is not a problem to leave the kids” (an urban full-time female student).

6.5.8 TYPE OF INTERNET CONNECTION

The seventh question was: *In your view, why did the students who had a DSL internet connection show more liking for the adoption of e-learning for distance education than those who had dial-up connection?*

All the students indicated that the DSL internet connection is much faster than the dial-up service which allows quicker browsing and downloading of information and “...thus it does not cause boredom or disappointment from the slowness or stoppage...”, as an urban part-time female student commented. Another female student added:

“My mum can use the phone while I surf the internet to do a task, this is not possible with the dial up connection...”

One student also explained that adopting e-learning for distance education requires staying lengthy periods on the net to “do heavy tasks such as listening to an on-line lecture,” that is not possible otherwise via “the ultra slow dial-up connection”.

6.6 SUMMARY

In this chapter, the results of the study were described. First, the final assessment of the questionnaire reliability and validity was presented. The instrument demonstrated high levels of internal reliability and construct validity. Second, the research sample was described. Third, the chapter provided answers to the four research questions. The first question was concerned with the factors influencing BIS and BID. The second question was on the moderating role of gender and IE on the links between BI and its determinants. The third question was concerned with the mediating effect of attitude, SN and PBC on the links between BI and their salient beliefs. The fourth question was concerned with the difference between the students in their BI based on selected demographics. Finally, the chapter reported the results of the semi-structured interviews that were conducted to explain the rejected hypotheses. The next chapter will discuss the research results in light of the extant research.

7.1 INTRODUCTION

This chapter discusses and reflects upon the findings of this research. The research questions and hypotheses will be addressed, along with a discussion of the results. Firstly, the chapter will discuss the validity of the research instrument. Secondly, it will discuss the findings emerged from assessing the research model. This includes looking at the direct effects of each construct in the model, as well as the moderating and mediating effects of the constructs. In addition, the discussion will cover the comparisons made between the students in their BI to adopt e-learning based on selected demographics. It will conclude with a summary.

7.2 THE VALIDITY OF THE RESEARCH INSTRUMENT

The development and validation of the research instrument proceeded through a number of stages. It started with a review of the research into adoption and the acceptance of web-based systems to identify the factors and measures developed to tap these constructs. Following this, an online focus group study revealed a number of e-learning related constructs and helped to generate items for measuring them. Afterwards, the instrument was translated and modified by bilingual experts, following which the instrument was rigorously content validated by a panel of four experts in e-learning. The questionnaire was checked after that by five participants from the study population to address issues of timing, typos, layout and comprehensibility. Then the instrument was initially piloted with 132 students to establish its reliability and construct validity. Another pilot study with 94 female students was undertaken to further ensure better psychometric properties. The findings demonstrated that the research instrument (the Arabic version) holds promise for investigating users' perceptions, attitude and intentions to adopt e-learning or related technologies in similar contexts. The internal consistency of the instrument was assessed using Cronbach's alpha. Nunnally (1978) suggested that, for confirmatory research, reliability should be equal to or above 0.70. The reliability scores of the various scales in the instrument were all above 0.80, which is above the acceptable threshold for reliability. This suggests that the instrument of this study possessed a high level of internal consistency.

Construct validity of the research instrument was assessed by performing a factor analysis to test convergent and discriminant validity as suggested by Straub et al. (2004). All the extracted factors had eigenvalues of 1 and the items loaded cleanly on their associated factors (loadings of $> .40$); hence, convergent validity was established (Straub et al., 2004; Hair et al., 2006). Likewise, all items loaded cleanly on their associated factors (loadings of $> .40$) and did not cross-load; thus, discriminant validity was established (Straub et al., 2004; Hair et al., 2006). Moreover, according to

Guadagnoli and Velicer (1988) and Stevens (2001), a factor is regarded as reliable if it has:

Four or more loadings above 0.60;

Three loadings above 0.80;

About 10 or more low (0.40) loadings and the sample size is about 150.

The majority of the factors in this research satisfied the first and second criteria suggested by Guadagnoli and Velicer (1988) and Stevens (2001). To conclude, the results of the factor analysis indicated that the extracted factors were reliable and that construct validity was established. This implies that the instrument provided a valid measure of the theoretical constructs incorporated into the model.

Previous studies on the acceptance of internet-based systems showed similar high levels of reliability and validity. This was particularly evident in the studies that adopted the measures of TRA, TPB and TAM. For example, Lowry, (2004) translated TAM into Arabic and reported very high internal reliability (0.84) and construct validity. Similarly, some studies reported alpha scores of above 0.90 for all its measures (Yi, Fiedle, & Park, 2006).

7.3 FACTORS INFLUENCING STUDENTS' BI TO ADOPT E-LEARNING AS A SUPPLEMENTARY TOOL AND FOR DISTANCE EDUCATION

The aim of this study was to understand the factors that influence BI to adopt e-learning by University students as a supplementary tool and for distance education. Based on an extensive literature review and a qualitative study conducted with University students in an online focus group, a model for the adoption of e-learning as a supplementary tool and for distance education was proposed to explain the students' BI to adopt e-learning. The next section discusses the findings from the assessment of the model.

The research proposed model hypothesised that three factors are influencing students' BI to adopt e-learning as a supplementary tool (i.e. to complement and facilitate their face-to-face studies) and for distance education (i.e. to use it as a stand-alone distance education method). These factors are attitude towards adopting e-learning, Subjective Norm regarding adopting e-learning and Perceived Behavioural Control over adopting e-learning. As the study was also interested in determining the underlying structures of these factors, they were further decomposed into several underlying beliefs. In addition, the model hypothesised that two demographic variables, that is gender and internet experience moderate the paths from the main factors to behavioural intention.

7.3.1 BEHAVIOURAL INTENTION TO ADOPT E-LEARNING AS A SUPPLEMENTARY TOOL AND FOR DISTANCE EDUCATION

The results revealed that the three factors explained 20% of the variance in BI to adopt e-learning as a supplementary tool. The explanatory power of the model to explain BIS is moderate. PBC was the strongest predictor, followed by Subjective Norm and attitude. The beta weight for PBC is moderate while for attitude and SN were weak

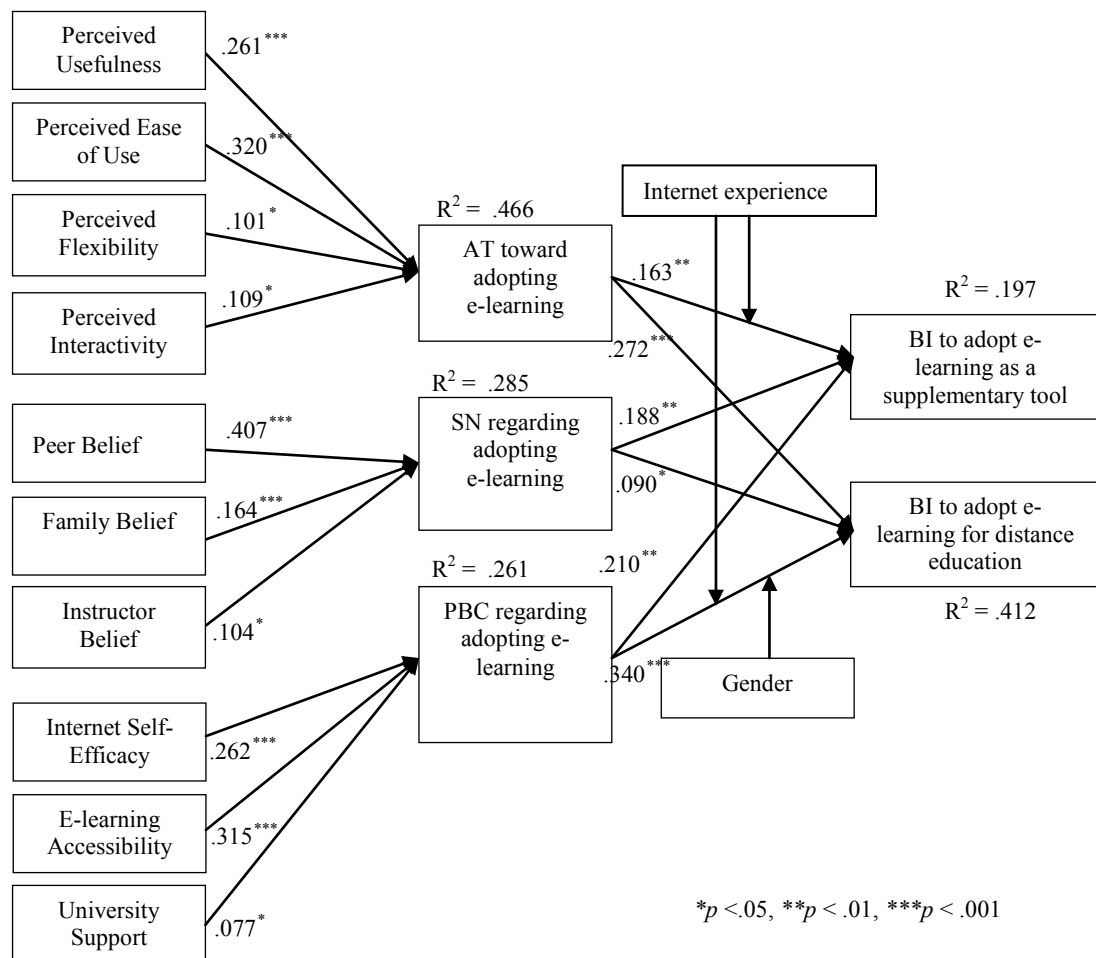


Figure 7-1: The Research Model

according to the rules recommended by Acock (2008). The small but significant beta weights suggest that the variables may be useful in predicting the criterion, but their shared predictive power was taken up by another independent variable. That is, the variable may be important at an explanatory level, in that it is related to the criterion, but unimportant in a predictive sense for the reason that, in combination with the other variables in the equation, it adds little (Norman & Streiner, 2008). This implies the possibility of existence of other unstudied variables that may be of great significance in explaining BIS.

Moreover, the three constructs explained 41% of the variance in BI to adopt e-learning for distance education, with PBC also as the strongest factor, followed by attitude and Subjective Norm. The explanatory power of the model to explain BID is

thus strong according to the guidelines suggested by Cohen (1988) and Acock (2008). Upon looking at the magnitude of the beta weights, PBC and attitude have moderate significant beta weights, while SN has weak, yet significant beta weight (Acock, 2008). Thus, SN may be considered as helpful in explaining BID, yet its predictive value is minimal (Norman & Streiner, 2008). Again, this outcome suggests that other variables could be of greater utility in explaining BID.

The findings that attitude, SN and PBC are significant factors influencing BI, are consistent with earlier research (Schifter & Ajzen, 1985; Ajzen & Madden, 1986; Godin & Kok, 1996; Armitage & Conner, 2001; Hagger et al., 2002). The findings also provide support for other research on the adoption of internet-based systems that applied the TPB as a framework (Ndubisi, 2006; Lee, 2009a, b). This study contributes by validating this model for the Saudi students, a sample that was not considered by earlier research in the e-learning domain.

7.3.2 PERCEIVED BEHAVIOURAL CONTROL

Perceived Behavioural Control is the students' perceived ease or difficulty of adopting e-learning. This factor is assumed to reflect anticipated impediments and obstacles to the adoption of e-learning. The findings of this research revealed a significant impact of this factor on the students' intentions to adopt e-learning in both contexts. In effect, PBC emerged as the strongest determinant of BI to adopt e-learning as a supplementary tool and also for distance education. This finding indicates that perception of control can have an important impact on the students' behavioural intention to adopt e-learning, namely, the more that adopting e-learning is viewed as being under control, the stronger their intentions are to adopt it. This is consistent with previous research (Chia et al., 2006; Saadé, et al., 2008; Lee, 2009b). Nevertheless, in a study by Lee (2010) PBC was found as the least important factor influencing users' continuance intention toward e-learning. This is probably due to the excellent infrastructure of the internet in Taiwan. In contrast, reliable and cheap internet access is not common among the students in Saudi Arabia (Dwivedi & Weerakkody, 2007; Bates, 2009). Control issues, such as internet access and connection costs, have been found as major barriers to the adoption of web-based learning in the Saudi context and elsewhere (Al-Khaldi & Al-Jabri, 1998; Al-Arfaj, 2001; Allehaibi, 2001; Henderson, 2005). In a context where the resources and infrastructure of e-learning are still developing, control factors become critical (Al-Mobarraz, 2007; Dwivedi & Weerakkody, 2007), particularly where the learners have only recently been introduced to the technology (Brown, 2002).

7.3.3 ATTITUDE

The students' attitude or their favourable or unfavourable evaluation of adopting e-learning was found to be a significant factor influencing BI to adopt e-learning as a supplementary tool and for distance education. This finding implies that the students' attitude towards e-learning determines their decision to adopt e-learning. The more

favourable the attitude towards adopting e-learning is, the stronger the person's intention is to adopt it. This finding supports the majority of studies that reported a significant influence of attitude on BI to adopt e-learning (Ndubisi, 2006; Huang et al., 2006; Abdel-Wahab, 2008). Yet, there is also empirical research that reported insignificant influence of attitude on intention (Venkatesh et al., 2003). That is, a positive attitude towards the technology does not translate into intentions to use the technology (Afari-Kumah & Achampong, 2010).

Moreover, attitude seemed to play a more important role in the context of adopting e-learning for distance education than for adopting it as a supplementary tool. As discussed in the literature, attitude can be a dominant determinant of intention over other factors such as SN when personal consideration is stronger (Ajzen & Fishbein, 1980; Ajzen, 1991; Mahmood et al., 2005). Thus, attitude is a significant predictor of intention in the context of distance education, because adopting e-learning for distance education is most likely triggered by personal needs and benefits which overshadow the influence of any perceived social pressure. This finding matches the findings of a study by Saadé et al., (2008) who found attitude to be a more important predictor of intention than SN in the domain of web-based distance education.

7.3.4 SUBJECTIVE NORM

Subjective Norm or the social influence reflects the opinions of others regarding the behaviour under investigation. The TRA and TPB suggest that SN influences intentions to perform behaviour. This research has revealed a somewhat different picture. SN was found to have significant influence on intention in the context of adopting e-learning for supplementary purposes confirming thus prior research on the adoption of e-learning (Ma & Clark, 2003; Saadé et al., 2008). Hartshorne and Ajjan (2009) found that SN is an important determinant of the adoption of Web 2.0 technologies to supplement in-class learning. In contrast, Miller et al (2003) and Yuen and Ma (2008) have reported an insignificant role of SN on acceptance of e-learning to deliver online education. As discussed in the introduction, the Saudi context still values the opinions of the family and society, thus, SN was found to play a role in shaping the students' intentions to adopt e-learning in the context of the current study. Nevertheless, the findings revealed that SN has a marginal influence on students' intention to adopt e-learning for distance education. This outcome is inconsistent with the majority of the literature on TPB that reported a significant impact of SN. A possible explanation of such incompatible results is that adopting e-learning for distance education, as mentioned earlier, is viewed more as a personal issue that is related directly to a student's own circumstances, hence, other people's opinions may not be seriously important. However, adopting e-learning to supplement one's study in a conventional educational setting (face-to-face), where instructors and peers play central roles, is prone to pressure from those important players.

In addition, the role of SN may be more prominent prior to or during the early stages of e-learning adoption, where the students have limited experience from which to

form attitudes and the uncertainty is high (Hartwick & Barki, 1994; Taylor & Todd, 1995b; Ndubisi, 2004). Thus, in deciding to adopt e-learning for distance education, which can be seen as a more advanced stage of adopting e-learning, SN no longer exerts significant weight, unlike in the preliminary stages of adopting e-learning that usually involve blended learning (i.e. using elements of e-learning to supplement face-to-face learning). Moreover, the fact that, in a distance education course, participation is voluntary, the influence of others is not a likely key factor (Ndubisi, 2004). Hartwick and Barki (1994) and Venkatesh and Davis (2000) argued that, SN is only important in mandatory settings, whereas it is insignificant in voluntary contexts.

This study is also aimed at explaining BI to adopt e-learning by further determining the underlying constructs of attitude, SN and PBC.

7.3.5 ANTECEDENTS OF ATTITUDE

The research model postulated that attitude towards adopting e-learning could be determined by four factors: perceived e-learning usefulness, perceived ease of use, perceived flexibility and perceived interactivity. The findings revealed that, PEOU was the most important antecedent of attitude towards adopting e-learning. This is in agreement with previous research (Moon & Kim, 2001; Qiu, Davis & Gregory, 2003; Ndubisi, 2004; Ngai et al., 2007). Furthermore, this result agrees with the finding reported by Yousafzai et al., (2007) and King and He (2006) in their meta-analysis that PEOU was more significant than PU in determining the attitude of students samples. PEOU in the context of this study refers to the beliefs that, adopting e-learning would be free from effort and thus easy to understand, learn and use. This finding implies that if the students perceive e-learning as easy to use, they tend to hold more favourable attitude towards adopting it. This substantial influence of PEOU is probably due to the fact that e-learning has been newly introduced in the study context.

The findings also revealed that PU was a significant antecedent of attitude. This finding agrees with previous studies (Ndubisi, 2004; Mahmod et al., 2005; Martínez-Torres et al., 2006; Shen et al., 2006; Masrom, 2007). PU represents perceptions of the utility values derived from using a specific system (Davis, 1989; Venkatesh & Davis, 2000). Indeed, e-learning offers the students substantial benefits. They can access and download lecture materials easily, as well as access a wide range of resources. They can share aspects of learning with other students and instructors in different locations through collaboration and obtain immediate feedback. Thus, if a student perceives e-learning to be useful, he/she is more likely to have a positive attitude towards adopting it (Ndubisi, 2006). These findings support the strong empirical evidence of the utility and effectiveness of the TAM constructs of PU and PEOU in explaining attitude.

Moreover, the findings showed that perceived interactivity was a significant antecedent of attitude. This finding concurs with the outcomes of several prior studies (Wu, 1999; Hwang & McMillan, 2002; Jee & Lee, 2002; Fiore & Jin, 2003). Greater perceptions of e-learning interactivity seem to foster more favourable attitudes towards adopting e-learning. In fact, interactivity is a crucial feature of e-learning (Bates, 2005),

that allows synchronous and asynchronous two-way communication. If the students feel that e-learning is an interactive tool, that is to say, it allows a variety of interactive communication means such as between the students and their peers and their tutors, they will have more favourable attitudes towards it. Specialised web forums and mailing lists are examples of such capabilities. Such features are especially indispensable for the distance education students.

The findings have also revealed that perceived flexibility is a significant antecedent of attitude. This finding is in accordance with the research conducted by Lee (2001), Hao (2004) and Yaghoubi et al. (2008). Perceived e-learning flexibility refers to the degree to which the students believe that using e-learning would offer them flexibility in learning as to the time and place, as well as continuing their studies, while having other responsibilities such as a family or work (Sun et al., 2008). Compared to traditional face-to-face education, e-learning offers a more flexible mode of study (Selim, 2007). Such flexibility is a key factor in distance education (Wagner et al., 2005). This study thus provides empirical support to the significance of perceived e-learning flexibility in shaping positive attitudes towards e-learning.

7.3.6 ANTECEDENTS OF SUBJECTIVE NORM

This research sought to identify the sources of the students' SN regarding adopting e-learning. The focus group study identified three groups whose opinions are important for the students in relation to the adoption of e-learning: peers, family and instructors. The findings have showed that the beliefs of peers regarding adopting e-learning, was the most significant antecedent of SN. This implies that students consider their peers' opinions in forming their own decisions to adopt e-learning. The influence of peers is usually important in the students' life and their opinions often carry more weight than any other referent group (Dalton, 1987; AlAwadhi & Morris, 2008). This finding is consistent with prior research that found peers to be influential in determining students' acceptance of technology and usage behaviour for online courses (Schmitz & Fulk, 1991; Mathieson, 1991; Taylor & Todd, 1995a; Ma & Clark, 2003; AlAwadhi & Morris, 2008). Peers may contribute to perceptions by directing attention to salient characteristics of the system (Fulk, Steinfeld, Schmitz, & Power, 1987).

Another important group identified in this research as a source of SN was a student's family. The finding revealed that a student's family was a significant antecedent of their SN regarding adopting e-learning. This finding provides empirical evidence of the influence of the family in determining the students' decision to adopt e-learning. As discussed in the literature, the Saudi context is characterised by strong family ties (Metz, 1992; Vassiliev, 2000; Long, 2003). In fact, family is an important social institution in Saudi Arabia. The students are expected to obey their parents even at the age of university and there is no separation or autonomy from the family home. However, with the modernisation and globalisation trends, the strong influence of the family has become less prominent than it once was (Long, 2003).

Moreover, the findings showed that instructors' belief regarding adopting e-learning was an important source of SN. This outcome implies that the students may be motivated to adopt e-learning for their studies under the pressure of their instructors. Thus, the instructors may play a vital role as implementers of e-learning systems (Newton & Ellis, 2006). This finding also concurs with prior research (Mathieson, 1991; Taylor & Todd, 1995a; Ma & Clark, 2003; Ndubisi, 2004).

7.3.7 ANTECEDENTS OF PERCEIVED BEHAVIOURAL CONTROL

In this research, three constructs were proposed as control factors shaping the students' PBC over adopting e-learning. These constructs were internal, as well as external factors that may facilitate or hinder students' adoption of e-learning. Internet self-efficacy is an internal control factor, whilst perceived e-learning accessibility and university support are external control factors.

The findings of the study revealed that PA was the most significant antecedent of PBC. In this research, PA covered the cost, the speed of the internet connection, as well as the availability of the internet at home. The findings suggested that, for a student to enjoy the advantages of e-learning, he/she has to have good access to internet technologies. Lack of access can be thus regarded as a major barrier to the adoption of e-learning. This provides support to prior research (Daugherty & Funke, 1998; Al-Khaldi & Al-Jabri, 1998; Allehaibi, 2001; Siritongthaworn et al., 2006; Dwivedi & Weerakkody, 2007; Henderson & Stewart, 2007; Al-Somali et al., 2009; Hamner & Al-Qahtani, 2009). It is therefore important to ensure that the students have adequate access to e-learning before implementing such systems (Chia et al., 2006).

The findings also showed that ISE was a significant antecedent of PBC. This is consistent with previous studies (Ndubisi, 2004, 2006). Such a result implies that higher levels of ISE, lead to higher levels of PBC. This factor operates by influencing cognitive, motivational, affective and decisional processes (Bandura, 2006c). Bandura (1997) argues that, individuals who doubt their abilities in a particular domain of activity, withdraw from difficult tasks in such domains. Hence, they lack motivation, as they have low aspiration and little commitment. On the contrary, a high sense of efficacy improves socio-cognitive functioning in a particular domain. That is to say, an individual who believes strongly in his/her capabilities will approach difficult tasks as challenges to be overcome, rather than risks to be avoided (Bandura, 1997). ISE is, therefore, one key factor governing the adoption of innovations (Bandura, 2006b). The students with high ISE may perform internet-based learning tasks better than the students would with lower ISE (Tsai & Tsai, 2003).

The findings also revealed that US was an important factor in determining the students' PBC. This result is in accordance with prior research (Soong et al., 2001; Wagner & Flannery, 2004; Cheung & Huang, 2005; Selim, 2007; Ngai et al., 2007). Effective support necessitates the provision of resources such as, computer facilities for students to access the internet and a supportive environment through training and help

desks that encourage using e-learning as part of university studies. In addition, such support is crucial for preparing novice users to use e-learning system, as well as preventing the students being deterred from using e-learning after encountering technical problems (Cheung & Huang, 2005). If technical support is lacking, the students may not effectively exploit any good quality resources (Soong et al., 2001). Previous failures of e-learning projects, as Selim (2007) argues, were due to the lack of access to technical advice and support. Thus, adequate technical support in the form of training and handling students' queries throughout their course of study is critical to a successful e-learning implementation (Soong et al., 2001). The finding thus suggests that providing support may lead to greater perceptions of control over adopting e-learning which will eventually lead to adoption.

Back to answer the first research question, the factors proposed in the research model were found significant in shaping the students' decision to adopt e-learning. The three factors, i.e. attitude, SN and PBC were significant key factors that influenced BI to adopt e-learning as a supplementary tool and for distance education. Likewise, PEOU, PU, PF and PI were significant antecedents of attitude towards adopting e-learning. Similarly, PB, FB and IB were significant sources for shaping the students' SN regarding adopting e-learning. Finally, PA, ISE and US significantly influenced PBC over adopting e-learning.

7.4 MODERATING EFFECTS OF GENDER AND INTERNET EXPERIENCE

Moderator variables are playing an increasingly significant role in social sciences research (Aguinis, 2004). Examining the impact of moderating variables could contribute to important advances of theories and practice (Baron & Kenny, 1986; Aguinis, 2004). The second question in this study was concerned with the moderating effects of two demographic variables: gender and IE on the relationship between the three determinants of intention, i.e., attitude, SN and PBC with intention. Studies focused on studying the acceptance of technology have largely examined the direct influence of various factors on adoption (Venkatesh et al., 2003). This study proposed that the students' demographics could have an indirect effect on intention by moderating the links between the main factors and the adoption intention. Knowledge of the moderating effects of the students' characteristics, specifically gender and internet experience, may provide a deeper understanding of the decision to adopt e-learning amongst various segments of the students. This would help to tailor specific strategies that consider each group, thus, increasing the likelihood that e-learning will be adopted. To answer the second question, the procedure suggested by Baron and Kenny (1986) and Aguinis (2004) to assess the moderating effect of a variable were followed.

7.4.1 GENDER

The findings revealed that gender plays a role in determining the strength of the relationship between PBC and the intention to adopt e-learning for distance education.

This finding provides empirical evidence to the moderating role of gender and supports other studies of Umrani and Ghadially (2008) and Zhang et al. (2009). However, it is not compatible with the results that Ramayah and Jaafar (2008) reported. The findings revealed that, even with the rise in PBC of female students, they did not express such a high intention to adopt e-learning for distance education, as the male students did. The influence of PBC on intention is more prominent for men. To put it another way, as the students perceived more control over adopting e-learning, male students showed higher intentions to adopt e-learning than the female students. Prior research has revealed differences between men and women in perceptions and patterns of the use of technology (Tsai et al., 2001; Peng et al., 2006; Zhou & Xu, 2007). It has been reported that men more than women feel that they are in greater control over using technology. Men felt more confident with their IT skills and tended to show more positive perceptions towards technology than women did (Keller et al., 2007). Female users tended to feel less competent and comfortable in using technology. They also showed greater computer anxiety and a lower degree of PU and PEOU than male users (Young, 2000; Schumacher & Morahan-Martin, 2001; Keller et al., 2007).

7.4.2 INTERNET EXPERIENCE

The literature suggests that previous experience is a significant determinant of behaviour (Fishbein & Ajzen, 1975; Bagozzi, 1981; Taylor & Todd, 1995b). The current study hypothesised that internet experience may moderate the strength of the relationships between attitude, SN and PBC on the one hand and intention on the other. The findings confirmed this proposition and revealed a moderating effect of internet experience on the links between attitude and intention to adopt e-learning as a supplementary tool, as well as between PBC and the intention to adopt e-learning for distance education. These findings are compatible with prior research (Taylor & Todd, 1995b).

As the attitude becomes more positive, the intention to adopt e-learning as a supplementary tool, strengthens. This relationship is very strong for students with low levels of internet experience. One explanation of such moderation effect is that, those students with low levels of internet experience may count on other sources to come to a decision regarding the adoption of e-learning. One source of information can be their attitudes about e-learning. Thus, internet novice students may be more influenced by their attitudes regarding e-learning than savvy students who are more likely to rely on their experience as will be seen next.

Furthermore, internet experience moderates the link between PBC and the intention to adopt e-learning for distance education. This is consistent with the findings of Taylor and Todd (1995b) in that, experience moderates the link between intention and PBC. Taylor and Todd (1995b) found that, for experienced users, the path from intention to PBC was stronger than for the inexperienced users. The findings of this study also revealed that, as perceptions of control over adopting e-learning increased, students' intention to adopt e-learning for distance education, increased. However, this

relationship depends on the level of internet experience. This link is more salient for experienced students. This implies that high intentions to adopt e-learning are not only triggered by higher perceptions of control over its adoption, but also by experience of using the internet which is the backbone of e-learning. Explicitly, the knowledge obtained from past experiences, helps to determine the intention (Eagley & Chaiken, 1993; Fishbein & Ajzen, 1975), because experience makes knowledge more accessible in memory (Fazio & Zanna, 1981).

To sum up, in answering the second research question, the results of this research showed that the two demographics had some moderation effects on the links between the main factors and intention.

7.5 MEDIATING EFFECTS OF ATTITUDE, SN AND PBC

The third question in this research was concerned with the mediating effects of the global constructs of the TPB on the relationships between intention and the belief constructs, i.e. attitudinal, normative and control beliefs. To answer this question, the extent to which TPB constructs mediated the impact of the belief-based variables on BI, was tested. The steps suggested by Baron and Kenny (1986) to assess mediation were followed. The results revealed that the three direct determinants of intention, i.e., attitude, SN and PBC, mediated the relationship between the belief constructs (indirect factors) and intention as suggested by the TPB.

The findings also revealed that attitude mediated the relationship between the four attitudinal beliefs, and intention to adopt e-learning as a supplementary tool. Attitude fully mediated the relationship between PEOU, PF, PI and intention to adopt e-learning as a supplementary tool. In addition, attitude attenuated the relationship between PU and intention; nonetheless, there was a significant direct effect of PU on intention. This finding is in line with earlier studies (Davis et al., 1989; Ndubisi, 2004). Similarly, attitude mediated the relationship between all four attitudinal beliefs and intention to adopt e-learning for distance education. This finding supports previous research (Mahmod et al., 2005; Ramayah & Suki, 2006). Attitude carries the influence of the external attitudinal beliefs on intention. This suggests the significant role that attitude plays in the decision to adopt new technology.

Furthermore, the findings revealed that SN mediated the relationship between the three normative beliefs and intention to adopt e-learning as a supplementary tool and for distance education, thus, confirming the findings reported by Ndubisi (2006). This finding reflects the importance of SN in explaining and predicting intention to adopt e-learning.

In the case of PBC, the findings of this study showed that PBC mediated the relationship between the three control beliefs and intention to adopt e-learning as a supplementary tool and for distance education. These outcomes are consistent with results from other studies by Luarn and Lin (2005) and Wang et al. (2006). PBC plays a

significant role in determining the decision to adopt e-learning and appears to be sufficient (along with AT and SN) to explain behavioural intention to adopt e-learning.

In answering the third research question, the findings of this study seem to provide support for the hypothesis, that the TPB constructs mediate the effects of the belief-based constructs (external factors) on intention. As Ajzen (1985) argues, any other factor, “will be related to behaviour if, and only if, they influence the beliefs that underlie the behaviour’s attitudinal or normative determinants” (p. 14). Armitage et al. (2002), Christian et al. (2007) and Godin et al. (2004) reported similar conclusions in their research. These findings provide further empirical support for the value of the factors proposed in the TPB, since these factors can transmit the influence of external variables on intention. However, it is also important to employ measures of specific beliefs, in addition to the measures of the theory, in order to enhance understanding of the underlying structures of the three factors and improve prediction.

7.6 DIFFERENCES BETWEEN THE STUDENTS

This section discusses the results of the fourth question which addressed the difference between the students in their intentions to adopt e-learning as a supplementary tool and for distance education based on selected demographics.

7.6.1 *GENDER*

Although the internet has been regarded as male-dominated technology, females are also increasingly adopting it, which accelerates closing the gender gap in ICT usage (Rainer et al., 2003). In this study, both male and female students showed equal interest to adopt e-learning as a supplementary tool. This outcome is in agreement with previous research, which revealed a non-significant difference between males and females in their perceptions and behaviour regarding the technology associated with the internet (Leong et al., 2002; Tsai & Lin, 2004; Lau, 2007).

Nevertheless, the study results also revealed a significant difference between male and female students when it came to adopting e-learning as a distance education mode. In the current research, men showed greater interest in adopting e-learning for distance education than women did. This result was echoed in earlier studies (Tsai et al., 2001; Peng et al., 2006; Zhou & Xu, 2007). Morahan-Martin and Schumacher (2007a) note that, although the fast changing makeup of internet and computer users has weakened several earlier demographic indicators, nonetheless, gender differences still exist. For instance, the existing literature has revealed a more favourable attitude and acceptance of ICT systems and applications by males than females (Mitra et al., 2000; Enoch & Soker, 2006; Premkumar et al., 2008).

The qualitative data gives insights into why the Saudi women of this particular context, had less intentions to adopt e-learning for distance education than men. The interview data uncovered a social ground for such low interest. Family beliefs regarding

the internet may have determined the students' decisions whether to adopt e-learning as a stand-alone method of study or not. Some students indicated that, for some families, the internet is perceived as a harmful tool and they therefore disapproved of using any internet-related applications.

Moreover, family values about male and female roles could provide another explanation for the high interest in e-learning by men. The students rationalised the men's greater interest in e-learning in that, men in the Saudi society, have more social responsibilities than women do. In particular, men are the main source of income in the family. In the Saudi society and in accordance with the teachings of Islam, a woman is not responsible for any spending in the family even if she works or is affluent. Thus, adopting e-learning for distance education will help men to further their education, whilst also attending to their commitments. Furthermore, the students pointed out that, adopting e-learning for distance education would minimise many women's chances for socialising in a conservative society such as Saudi Arabia. Thus, women probably prefer face-to-face learning where they can mingle and meet people.

7.6.2 MODE OF STUDY

As described previously, there are two modes of study at King Abdul Aziz University: full-time and part-time or *intisab*⁶. The results of this study revealed that both full-time and *intisab* students are similar in their intentions to adopt e-learning as a supplementary tool. This suggests that e-learning attracts both groups of students equally, due to its advantages for both full-time and part-time students (Bennedsen & Caspersen, 2003). However, the results revealed that, in adopting e-learning for distance education, *intisab* students showed greater intentions to adopt it than full-time students did. The students in the interviews stated that, e-learning enables the *intisab* students to access materials, resources and communicate with their tutors and peers from a wider geographical area without moving from their chairs. E-learning holds advantages for part-time and distance learning students that stem from its flexibility and interactivity (Bennedsen & Caspersen, 2003). Since part-time students are not usually attending the university for different reasons, e-learning offers different effective means to compensate for their absence. Within the Saudi context, e-learning can facilitate education, especially in the absence of reliable transportation and postal systems that are vital for part-time and distant students.

7.6.3 PLACE OF RESIDENCE

The findings of this study revealed that the students who came from rural areas did not differ in their intentions to adopt e-learning as a supplementary tool compared with the students who resided in the city. This implies that both groups of students in

⁶ *Intisab* is a hybrid between the full-time and distance learning modes of study. In this mode, the student is required to take full load, yet, she or he does not need to attend on a regular basis, rather, the student should only be present for final examinations (Al-Ghonaim, 2005).

the sample are equally willing to adopt e-learning to supplement their studies for the advantages which e-learning offers them. In other words, e-learning advantages are well understood by both rural and urban students as a way to enrich their regular studies. This outcome supports earlier research (Ozdemir & Abrevaya, 2007).

However, when e-learning is used as a method to deliver the whole course, the rural students showed greater interest in adopting it. E-learning provides an alternative way of delivering education to students who are hampered by geographical barriers, such as rural students (Jennings, 2005). The students in the interviews indicated that, e-learning appeals to rural students, as it saves them commuting to their places of study. Additionally, with e-learning, students can have access to materials online and remain in communication with peers and instructors located elsewhere. The feeling of connectedness to people and resources created by e-learning capabilities can compensate for the disadvantages of living geographically distant from major areas and their facilities (Anderson, 2000).

7.6.4 FAMILY AND JOB RESPONSIBILITY

For many individuals in the past, academic calendars have not matched job obligations and courses offerings may not have met their needs. E-learning can facilitate and expand access to traditional education by meeting the needs of under-served students, such as those who have domestic or job commitment (Thompson, 2001). In this study, the students who reported to have family or job responsibilities did not differ in their intentions to adopt e-learning as a supplementary tool compared with the students who did not have such commitments. Again, this indicates that using e-learning to supplement studies, is perceived as useful by all the students. Despite the advantages of e-learning for the busy student that are reported extensively in the literature, the findings of this study revealed quite the opposite picture. In the study sample, the working students did not show more intentions to adopt e-learning for distance education, compared with the students who reported not having such commitments. The students in the interviews noted that, being a learner in an online setting is not the same as being a learner in a face-to-face setting. They emphasised that adopting e-learning for distance education requires certain skills (e.g. time-management skills) that are lacking in an instructor-led context such as their educational environment. The students of the sample have been embedded in this traditional milieu for a long period. They are not prepared to bear full responsibility for their own learning because their prior educational experience did not equip them for self-directed learning (Martinez, 2003). To be autonomous learners would thus be difficult. As such, adopting e-learning for distance education in this teacher-centred context, is not the best choice for students with family or employment commitments as the interviewed students indicated.

7.6.5 FACULTY

When the students of the different faculties were compared in relation to their intentions to adopt e-learning for supplementary purposes and distance education, the

findings showed that there was no difference between them when e-learning was intended for supplementing their studies. This shows that adopting e-learning as an aid to the university studies of the students, is equally considered by the students of the sample in both the Scientific faculty and the Humanities faculty. This was also reported by Al-Arfaj (2001) and Liaw (2002a).

On the other hand, the findings of this study revealed that the students who study the subjects of Humanities (e.g. Arts, Home Economics and Administration), showed greater intentions to adopt e-learning for distance education compared with the students of the Scientific Colleges. Adopting e-learning as a distance education mode represents a different educational experience to the face-to-face traditional settings. Some of the interviewed students indicated that, for scientific and practical subjects, such as Medicine, Physics and Chemistry, experimenting and direct hands-on activities are principal, thus, e-learning can be less suitable for such purposes. In contrast, the topic of Humanities, such as History and Philosophy, are more theory-oriented subjects that do not require practical applications, and hence, can be presented easily via e-learning.

7.6.6 TYPE OF INTERNET CONNECTION

With regard to the type of internet connection, the sampled students with the different internet connections did not differ in their intentions to adopt e-learning for supplementary purposes. Adopting e-learning to supplement one's study is considered by all the students regardless of the type of internet connection they have. The findings showed that they intend to adopt e-learning for supplementing learning, even in the case of students with the slowest internet connection. There is evidence in the literature suggesting that individuals will mitigate barriers to access internet-based activities if they have a greater valuation of these applications (Robertson, Soopramanien, & Fildes, 2007). This therefore suggests that, students who have a slow dial-up connection would be equally interested in investing in the benefits of e-learning to supplement their studies, just as the students who have high-speed satellite connection.

On the other hand, the students with different types of internet connections differed in their intentions to adopt e-learning for distance education. Adopting e-learning for distance education involves more than simple uses of the internet such as, browsing for information or sending e-mail messages. The interviewed students explained that, in stand-alone e-learning courses, extended periods of connecting to the internet is necessary, such as when listening to lectures or attending web-conferencing. Hence, this form of e-learning requires a high quality internet connection, such as those available via DSL and Satellite connections.

7.6.7 INTERNET EXPERIENCE

In this study, the findings revealed that, the students with different levels of internet experience, differed in their intentions to adopt e-learning for supplementary purposes and for distance education. In particular, in adopting e-learning to supplement their studies and for distance education, students with high internet experience, showed

greater intentions to adopt e-learning compared with those with little or average internet experience. This is consistent with prior research that showed the levels of internet experience are correlated with the adoption of web-based applications (Agarwal & Prasad, 1999; Pituch & Lee, 2006; Premkumar et al., 2008; Liao & Lu, 2008). Individuals with higher experience of the internet are more inclined to adopt internet-based products (Tan & Teo, 2000; Schumacher & Morahan-Martin, 2001; Tsai et al., 2001; Arbaugh & Duray, 2002; Kim et al., 2005).

7.7 SUMMARY

This chapter has discussed the research findings. It has provided a brief account of the reliability and validity of the research instrument. Subsequently, a discussion of the findings to each research question followed. The findings showed that the research model explained 20% of the variance in BI to adopt e-learning as a supplementary tool and 41% of the variance in BI to adopt e-learning for distance education. It has also revealed that PBC over adopting e-learning was the most significant factor influencing BI to adopt e-learning for both types of e-learning applications. Additionally, SN was the second most significant factor influencing BI to adopt e-learning for supplementing conventional education, yet, it was less important in the second application of e-learning for distance education. Moreover, attitude towards adopting e-learning was the second most important factor influencing students' intentions to use e-learning for distance education and the least important factor for adopting e-learning to supplement learning. The current research has also provided further evidence that gender moderates the link between PBC and BI to adopt e-learning for distance education. Similarly, internet experience was found to moderate the links between attitude and BI to adopt e-learning as a supplementary tool, as well as between PBC and BI to adopt e-learning for distance education. In addition, the analysis showed that the antecedents of the attitude towards adopting e-learning, in order of importance, were PEOU, PU, PI and PF. Moreover, the sources of the students' SN regarding adopting e-learning were peers, family and instructors beliefs regarding e-learning. The antecedents of PBC were PA, ISE and US. Further, the three determinants of BI were found to mediate the links between their corresponding salient beliefs and BI. In addition, when the students were compared based on their gender, mode of study, place of residence, job status, family responsibilities, faculty and type of internet connection, the results showed that they did not differ significantly in their BI to adopt e-learning as a supplementary tool. However, when they were compared, based on these demographics, as well as on their level of internet experience, the results showed significant differences between them in their BI to adopt e-learning for distance education. The following chapter will provide a conclusion to this study by highlighting the findings and suggesting implications for practice. It will also summarise the contribution and limitations of the study.

8.1 INTRODUCTION

This chapter provides a conclusion to the study by bringing together the research questions and hypotheses, together with the research findings and extant literature. It also provides a summary of this study. Furthermore, it states the implications of the findings. This chapter then outlines the contributions and limitations of this study. It concludes with suggestions for further research.

8.2 SUMMARY

This research sought to investigate the underlying factors that influence the students' behavioural intention to adopt e-learning as a supplementary tool and for distance education in the Saudi higher education context. The research was guided by the following four questions:

1. *Does the research conceptual model with its proposed factors explain the students' behavioural intention to adopt e-learning as a supplementary tool and for distance education?*
2. *Does gender and internet experience moderate the relationships between the three proposed determinants of behavioural intention (Attitude, Subjective Norm and Perceived Behavioural Control) and behavioural intention to adopt e-learning as a supplementary tool and for distance education?*
3. *Do the three proposed determinants of behavioural intentions to adopt e-learning (Attitude, Subjective Norm and Perceived Behavioural Control) mediate the relationships between their respective salient beliefs and behavioural intention to adopt e-learning as a supplementary tool and for distance education?*
4. *Do the students differ in their behavioural intention to adopt e-learning as a supplementary tool and for distance education based on selected demographics?*

In answering these questions, a number of hypotheses were formulated and tested using predominantly quantitative methods. Additionally, some qualitative data was gathered which helped in the explanation of some unexpected results.

The opening chapter of this thesis has highlighted that although there has been considerable research on the adoption and diffusion of internet and web-based systems, only few studies have gone beyond profiling users' characteristics (Bruch, 2003; Pituch & Lee, 2006; Park et al., 2007). Indeed, the literature review uncovered that there is paucity of empirical research which attempted to build theoretical models to explain the adoption of technology by the students (Park et al., 2007). Hence, the need for a theoretical model to explain the University students' intentions to adopt e-learning was the motivation behind this research.

This research proposed a model to explain the University students' intention to adopt e-learning either as a supplementary tool that supports face-to-face learning or as a standalone distance education mode. The model is principally built on the theories of Reasoned Action (Fishbein & Ajzen, 1975) and Planned Behaviour (Ajzen, 1985) which were proposed to explain general human behaviour. The model also incorporates different constructs derived from other significant theories in the field of ISM, i.e. the Technology Acceptance Model (Davis, 1989; Davis et al., 1989) and the field of Social Psychology, specifically the Diffusion of Innovations theory (Rogers, 1962, 2003) and Self-Efficacy (Bandura, 1997). Chapter Two has offered an extensive review of the research theoretical framework.

Chapter Three has set out the research conceptual model and portrayed the research hypotheses. The model postulated that the students' intention to adopt e-learning as a supplementary tool and for distance education can be determined by three factors: their attitude towards adopting e-learning, their Subjective Norm regarding adopting e-learning and perceptions of their control over adopting e-learning. The model also proposed that the relationships between the three factors and the intention may be moderated by two demographic variables, specifically gender and internet experience. Moreover, the model proposed a number of external factors as antecedents to attitude, SN and PBC.

The study followed a mixed-methods research design. Chapter Four has delineated the procedures followed during the three-stage research design. In the preliminary phase, an online focus group study was conducted to identify the students' salient beliefs regarding e-learning as well as to develop the questionnaire for the main study. In the second phase, a survey using a questionnaire was carried out to collect data for testing the research hypotheses. In the third phase, six students were interviewed to obtain further understanding of the unexpected results.

In this research, a great deal of attention was given to the development and validation of the research main instrument (the questionnaire). Chapter Five has described the operationalisation of the research constructs and items used to measure these concepts. It has also detailed the procedures taken to translate the questionnaire and establish its reliability and validity.

Chapters Six and Seven have reported and discussed the results of the research in light of the extant literature. The results showed that the students' behavioural intention to adopt e-learning as a supplementary tool was influenced by three factors. These factors are the students' perceptions of control over adopting e-learning; their SN regarding adopting e-learning and their attitude towards adopting e-learning. The results also showed that the students' intention to adopt e-learning for distance education was determined by the same factors, yet with a different order of importance. Perceptions of control over adopting e-learning emerged as the most important factor, followed by attitude and finally SN.

The results also showed that gender moderated the relationship between PBC and the intention to adopt e-learning for distance education. Internet experience also

moderated the relationship between attitude and the intention to adopt e-learning for supplementary purposes as well as between perceived control and intention to adopt e-learning for distance education. In addition, the results showed that the impact of attitudinal, normative and control beliefs on intention was mediated through the main determinants of intention, i.e. attitude, SN and PBC.

Moreover, the results showed that, when the students were compared with using selected demographics (gender, mode of study, place of residence, job and family responsibilities, faculty and type of internet connection), they did not show any differences in their intentions to adopt e-learning as a supplementary tool, except when they were compared on their level of internet experience. Furthermore, the study found significant differences between the students when they were compared in their intention to adopt e-learning for distance education using these demographics.

Chapter Eight offers a conclusion to this study by highlighting the main findings and describing their implications for practice. It also states the study contribution, limitations and suggestions for further research.

8.3 THE RESEARCH MAIN FINDINGS

8.3.1 *FACTORS INFLUENCING BI TO ADOPT E-LEARNING AS A SUPPLEMENTARY TOOL AND FOR DISTANCE EDUCATION*

This research proposed a model to explain students' intention to adopt e-learning as a supplementary tool and for distance education in a Saudi university. The model postulated that three factors could have direct influences on the students' intention to adopt e-learning: attitude towards adopting e-learning, Subjective Norm regarding adopting e-learning and Perceived Behavioural Control over adopting e-learning. Attitude is the students' overall evaluation of adopting e-learning. SN refers to the perceived social pressure to adopt or not to adopt e-learning. PBC means the students' perceived ease or difficulty of adopting e-learning.

The three factors were found to be significant in influencing the intention to adopt e-learning as a supplementary tool and for distance education. The model, with its three constructs, had a moderate explanatory power for explaining BIS. It explains 20% of the variance in the intention to adopt e-learning as a supplementary tool. The model had a strong explanatory power for explaining the intention to adopt e-learning for distance education as it explains 41% of the variance in BID. However, in each context, the importance of each factor is different. In both contexts of adopting e-learning to supplement conventional education and for distance education, PBC was the most significant factor influencing intention. Ajzen (1985) noted that, 'even very mundane activities, which can usually be performed at will, are sometimes subject to the influence of factors beyond one's control' (p. 24). Since e-learning is a new educational technology in the study context, it is not surprising that the students' perception of whether it is easy or difficult to adopt has emerged as the most significant factor for its

adoption. The students' intention to adopt e-learning may be compromised when they perceive an inability. This finding was also found in Singapore amongst internet non-users (Chia et al, 2006) and in Canada (Saadé et al., 2008).

During the online focus group and the semi-structured interviews with the students, it became clear that there are several obstacles to a smooth adoption and use of e-learning. Examples of such difficulties are internet connection costs and quality, the unavailability of adequate technical support and wide access to internet services in the campus.

SN emerged as the second significant factor influencing the students' intention to adopt e-learning to supplement their studies. Nevertheless, although SN has reached statistical significance, its small beta coefficient implies practical insignificance. In the context of adopting e-learning for distance education, SN had a marginally significant impact on the intentions to adopt e-learning. Again, its weak beta coefficient, render it practically insignificant.

In the conventional learning context, the presence of peers and instructors put the student under their direct influence. According to the theories of Reasoned Action (Ajzen & Fishbein, 1980) and Planned Behaviour (Ajzen, 1985), individuals may perform certain behaviour even if they do not have a favourable attitude towards the behaviour but because they think that an important other believes they should perform it and they have the motivation to comply with this referent. For instance, the instructor may require the students to use e-learning and the students usually comply with this request in such a 'semi-mandatory' context, even if they do not hold positive attitudes about it. Venkatesh and Davis (2000) refer to the mechanism underlying this effect of SN as compliance. Generally, the direct compliance effect of SN on the intention is suggested to function "whenever an individual perceives that a social actor wants him or her to perform a specific behaviour and the social actor has the ability to reward the behaviour or punish nonbehaviour" (Venkatesh & Davis, 2000, p.188), in a situation similar to the classroom. Thus, SN appeared to have greater weight in the conventional face-to-face context, whereas such an impact may decrease in contexts where certain social groups (peers and instructors) are not playing key roles. In contrast, in adopting e-learning for distance education, the students are more likely to choose to enrol in a distance e-learning programme based on their needs rather than the influence of other individuals', because they are usually aware of the nature and advantages of such a system. Additionally, the student is not expecting a punishment if he/she does not adopt e-learning for distance education or comply with orders from other people to adopt it. Hartwick and Barki (1994) and Venkatesh and Davis (2000) observed that SN is only significant in mandatory settings, whereas it is insignificant in voluntary contexts. As such, this finding is in accordance with several previous studies (Hartwick & Barki, 1994; Taylor & Todd, 1995a; Ndubisi, 2004).

Attitude towards adopting e-learning showed statistical significance as a factor influencing the students' intention to adopt e-learning as a supplementary tool and for distance education. However, its influence was greater in the context of adopting e-

learning for distance education, while it is practically insignificant in the context of e-learning as a supplementary tool. This suggests that the decision to adopt e-learning for distance education is probably more driven by the students' own needs and less by the influence of others. This outcome is consistent with the prior research of Davis (1989) and Ndubisi (2004), in which attitude was significant in shaping intention.

8.3.2 *ATTITUDINAL BELIEFS*

The research model also posited that attitude towards adopting e-learning is determined by four attitudinal beliefs: perceived e-learning ease of use, perceived e-learning usefulness, perceived e-learning interactivity and perceived e-learning flexibility. The findings provided empirical support for the significant influence of the four beliefs on attitude towards adopting e-learning. Perceived e-learning ease of use was the strongest factor shaping the students' attitude followed by perceived e-learning usefulness. The students who perceived e-learning as easy to use and useful for their university studies tended to have a more favourable attitude towards adopting e-learning. This finding provides support for TAM's constructs of PEOU and PU (Davis, 1989) and is consistent with earlier research (Ndubisi, 2004; Masrom, 2007, Abbad et al., 2009). Moreover, perceived e-learning interactivity and perceived e-learning flexibility were found to be significant in shaping the students' attitude towards adopting e-learning. High perceptions of interactivity and flexibility were found to be related with more positive attitudes (Wu, 1999; Lee, 2001; Hwang & McMillan, 2002; Jee & Lee, 2002; Fiore & Jin, 2003; Lee & Pituch, 2006).

8.3.3 *NORMATIVE BELIEFS*

The model also hypothesised that the students' peers, family and instructors are three important social groups that outline the students' SN regarding adopting e-learning. The findings showed that the belief of the peers regarding adopting e-learning was the most significant source of SN followed by the belief of the family and instructors. In the literature, the peers have been reported to be an extremely powerful influence in the students' life (Dalton, 1987; Schmitz & Fulk, 1991; Mathieson, 1991; Taylor & Todd, 1995a; Ma & Clark, 2003; AlAwadhi & Morris, 2008). The family has also been reported to exert a strong influence on shaping decisions of the Saudis (Metz, 1992; Vassiliev, 2000; Long, 2003). In addition, the influence of the instructor has been important in such an educational setting as prior research indicated (Mathieson, 1991; Taylor & Todd, 1995a; Ma & Clark, 2003; Ndubisi, 2004).

8.3.4 *CONTROL BELIEFS*

The research also proposed that PBC is determined by three factors: perceived e-learning accessibility, internet self-efficacy and university support. The findings of the study provided empirical evidence to confirm these hypotheses. PA was the most significant antecedent of PBC, followed by ISE and finally, US. This suggests that high and positive perceptions of e-learning accessibility, coupled with confidence in using

the internet and strong perceptions of adequate support from the University, may lead to greater perceptions of control over adopting e-learning. These findings are in accordance with earlier studies (Taylor & Todd, 1995a; Ndubisi, 2004; 2006; Selim, 2007).

8.3.5 THE MODERATING ROLE OF GENDER AND INTERNET EXPERIENCE

The findings of this research also showed that gender moderated the relationship between PBC and the intention to adopt e-learning for distance education. The influence of PBC on intention is more pronounced for men. As the students perceived greater control over adopting e-learning, the men showed greater intentions to adopt e-learning than women. This lingering trend amongst women is not surprising and has been reported in previous studies (Zhou & Xu, 2007). Men tend to have more positive perceptions towards technology whilst women have less favourable perceptions and suffer greater anxiety in relation to the technology (Keller et al., 2007).

Internet experience also moderated the relationship between attitude and the intention to adopt e-learning as a supplementary tool. Attitude towards adopting e-learning has an influence on the intentions to adopt e-learning for supplementary purposes more saliently for students with low internet experience. This suggests that the students' intention to adopt e-learning to supplement their studies could be associated with their attitudes towards e-learning and such a link is stronger for the less internet-experienced students. As this group of students have little knowledge about the internet, they seem to rely more on other sources, such as their overall attitudes to decide on the adoption of e-learning.

Furthermore, internet experience moderated the relationship between PBC and the intention to adopt e-learning for distance education. As perceptions of control over adopting e-learning increase, the intention to adopt e-learning for distance education strengthens. This influence is even stronger for students with higher internet experience. This finding suggests that the students' intention to adopt e-learning for distance education, is greatly triggered by their experiences of using the internet. With experience, the students have presumably overcome concerns about control over adopting e-learning, thus, showing a hasty interest in adopting e-learning for distance education. The benefits experienced from using the internet seemed to help in motivating the students to adopt e-learning. This is consistent with the argument of Eagley and Chaiken (1993) and Fishbein and Ajzen (1975) that knowledge derived from past experiences help to shape intention. Specifically, experience makes knowledge more accessible in memory and is thereby considered while formulating the intentions (Fazio & Zanna, 1981; Ajzen & Fishbein, 1980).

8.3.6 THE MEDIATION EFFECT OF AT, SN AND PBC

The findings of this research showed that attitude, SN and PBC have mediation effects on the links between the proposed external factors, i.e., attitudinal beliefs, normative beliefs and control beliefs and the intention to adopt e-learning as a

supplementary tool and for distance education. In other words, the main factors in the research model can transmit the influence of the external variables (salient beliefs) on the intention.

The findings showed that one's attitude mediates the relationship between perceived e-learning usefulness, ease of use, interactivity and flexibility and the intention to adopt e-learning as a supplementary tool and for distance education. In addition, SN appeared to mediate the relationships between all the normative beliefs and the intention to adopt e-learning as a supplementary tool and for distance education. Similarly, PBC mediated the links between perceived e-learning accessibility, internet self-efficacy and university support and the intention to adopt e-learning as a supplementary tool and for distance education.

Therefore, these findings suggest that the three determinants of intention, which are based on the theory of Planned Behaviour, seem to mediate the influence of the external variables on intention. These findings thus offer empirical support for Ajzen's proposition that, the TPB constructs carry the influence of any external variables on intention. Consequently, addressing the three constructs of attitude, SN and PBC may be sufficient to study the adoption of e-learning in this context. However, by looking at the variance that these factors (attitude, SB and PBC) have explained in the intention to adopt e-learning as a supplementary tool (20%) and the intention to adopt e-learning for distance education (41%), it can be clearly seen that other factors may play a role in determining the students' intention to adopt e-learning. However, these factors remain unexplored and thus, suggest topics for further research.

8.3.7 DIFFERENCES BETWEEN STUDENTS IN THEIR INTENTION TO ADOPT E-LEARNING AS A SUPPLEMENTARY TOOL AND FOR DISTANCE EDUCATION

The findings of the study showed that the students did not show differences in their intention to adopt e-learning as a supplementary tool when they were compared, based on their gender, mode of study, place of residence, faculty, having family and job responsibilities and the type of internet connection. These findings provide further empirical support to prior research (Al-Arfaj, 2001; Liaw, 2002a; Leong et al., 2002; Bennedsen & Caspersen, 2003; Tsai & Lin, 2004; Lau, 2007) which suggests that e-learning equally attracts the majority of students because of the benefits available to them. Nevertheless, the students with the different levels of internet experience showed differences in their intentions to adopt e-learning as a supplementary tool. The students with higher internet experience showed greater intentions to adopt e-learning than those with little or average internet experience. Other studies have also reported similar conclusions (Tan & Teo, 2000; Schumacher & Morahan-Martin, 2001; Tsai et al. 2001; Arbaugh & Duray, 2002; Kim et al., 2005).

On the other hand, the students in the research sample showed differences in their intention to adopt e-learning for distance education when they were compared on their gender, mode of study, place of residence, faculty, family and job responsibilities, type of internet connection and internet experience. In particular, the male students showed

greater interest in adopting e-learning for distance education than their female companions did. This outcome is consistent with some earlier studies (Tsai et al., 2001; Peng et al., 2006; Zhou & Xu, 2007). Similarly, intisab or part-time students expressed greater intentions to adopt e-learning for distance education than full-time students did. This finding has also been supported in prior research (Jain & Ngoh, 2003; Jennings, 2005; Dorman, 2005). Moreover, rural students reported greater interest in adopting e-learning for distance education than urban students did. This is in line with the findings of Hobbs et al. (1998) and Zhang et al. (2006).

In addition, the students who reported no job or family responsibilities showed greater intentions to adopt e-learning. These findings reflect the characteristics of the educational environment and the dominant learning style in the study context. The long-established teacher-centred environment does not prepare the students to bear the full responsibility for their own learning. Consequently, with family and job commitments, the students perceived adopting e-learning as another burden added to their obligations. Thus, they showed less interest in adopting it, compared with the unemployed or obligation-free students.

Furthermore, the students who studied subjects relating to Humanities (such as Arts, Home Economics and Economics and Administration), showed greater intentions to adopt e-learning for distance education than the students of the Scientific Colleges. This was also reported in a study by Hsbollah and Idris (2009). Moreover, the students who had faster internet connections (i.e., satellite, wireless and DSL connections), showed greater intentions to adopt e-learning for distance education than those who had a dial up connection. This is mainly because e-learning applications require a fast internet connection. Finally, the students with high internet experience showed greater intentions to adopt e-learning (in both BIS and BID contexts) than the students with low experience. Again, this outcome is in accordance with other studies (Tan & Teo, 2000; Schumacher & Morahan-Martin, 2001; Tsai et al., 2001; Arbaugh & Duray, 2002; Kim et al., 2005). The finding suggests that internet experience has a role in modifying intentions to adopt e-learning (Liao & Lu, 2008).

8.4 Implications of findings

This section outlines the implications of the research findings. The discussion is organised around each factor in the research model

8.4.1 *ATTITUDE TOWARDS E-LEARNING*

The study has revealed that the attitude the students hold toward adopting e-learning, is a significant factor for its adoption. Thus, creating a more favourable attitude towards adopting e-learning would encourage its adoption. The study has also found that high perceptions of e-learning's ease of use, usefulness, flexibility and interactivity are associated with positive attitudes towards e-learning. In other words, if the students genuinely believe that e-learning is easy to use, useful and offers interactive

and flexible capabilities, their attitudes towards adopting e-learning are expected to be more favourable. For this reason, raising the students' awareness of the potential of e-learning in facilitating their university studies can encourage positive attitudes towards e-learning, which could eventually increase the uptake of e-learning.

Rogers (2003) notes, "mass media channels are usually the most rapid and efficient means of informing potential adopters about the existence of an innovation-that is, to create awareness-knowledge" (p.18). The University should thus advertise the advantages of e-learning using the media and workshops to attract students.

8.4.2 PERCEIVED USEFULNESS

This research has provided further evidence that perceptions of usefulness are positively associated with attitude towards adopting e-learning. This finding implies that, in order to encourage favourable attitudes towards adopting e-learning, positive perceptions of the usefulness of e-learning are crucial. The focus needs to be primarily put on increasing the students' knowledge of how e-learning can help improve the efficiency and effectiveness of their learning. This can be achieved through arranging workshops, seminars, publications and guides on the benefits that e-learning can offer to the students and the society as a whole. In addition, e-learning developers should consider providing e-learning applications that are more suited to the university students' needs, as this could increase their use of e-learning.

8.4.3 PERCEIVED EASE OF USE

Previous studies have reported that one key barrier to user acceptance of a system, is the lack of user friendliness features in the system (Moon & Kim, 2001). The importance of PEOU in this study is illustrated by its significant effect on attitude. In dealing and interacting with a novel educational technology such as e-learning, if the students perceive e-learning as difficult and complex, they might be deterred from using such a system (Pituch & Lee, 2006). They may believe that the advantages of adopting e-learning are outweighed by the effort of using it. Eventually, they may become reluctant to adopt the system, hence defeating the goal of introducing it. User-friendly interfaces and features for e-learning applications can maximise its adoption and use. Thus, efforts should be placed upon fostering the students' perception of the ease of use of the system. When designing or selecting an e-learning system, its ease of use should be a priority feature (Qiu et al., 2003). An e-learning system should be easy to use. In addition, the University management should demonstrate the use of the system to the students to familiarise them with it prior to implementation. Such considerations have been found to enhance the adoption and diffusion of technology in other contexts (Rogers, 2003; Davis et al., 1989).

8.4.4 PERCEIVED FLEXIBILITY

The study findings have revealed that perceived e-learning flexibility plays an important role in building a positive attitude towards adopting it. An e-learning system

is flexible, in that, it allows students to access module content, hand in assignments, and complete tests online (Pituch & Lee, 2006). Flexibility features not only offer the students with learning experiences similar to face-to-face settings, but they also provide some advantages over the traditional class (Lee, 2001). As such, designing e-learning applications that integrate flexible features or allow the students greater flexibility in their learning would encourage the adoption of e-learning through building positive attitudes towards its adoption.

8.4.5 PERCEIVED INTERACTIVITY

The perceptions of e-learning interactivity appeared to influence the students' attitude towards adopting e-learning. As indicated by Palloff and Pratt (2007), for e-learning systems, the "key to the learning process are the interactions among students themselves, the interactions between faculty and students, and the collaboration in learning that results from these interactions" (p.4). Thus, perceived interactivity should be an important consideration in the design and selection of e-learning systems. In designing e-learning systems, integrating interactivity applications and tools (e.g. e-mails, bulletin boards or forums, chat rooms, etc.) should be a paramount task.

8.4.6 SUBJECTIVE NORM AND NORMATIVE BELIEFS

Subjective Norm regarding adopting e-learning has been found to influence the students' intention to adopt e-learning. This implies that the students rely on other people's perceptions of e-learning in forming their decisions regarding adopting e-learning. Thus, creating a climate that encourages the use of e-learning would promote more e-learning adoption. In order to increase the overall adoption of e-learning, social influence strategies such as information sharing sessions by peers and awareness campaigns may be helpful.

In addition, the study found the beliefs of the peers regarding adopting e-learning, as the most significant source of SN. Peers therefore play a vital role as promoters of adopting e-learning. Peer influence may occur by directing the students' attention to the characteristics of the system (Fulk et al., 1987). As such, the students should be informed of the advantages and potential of e-learning for their university studies. In addition, integrating assignments and tasks that involve more group projects comprising the use of the internet, would harness the social pressure from peers to use the internet.

Moreover, family influence ranked second in determining the students' SN regarding adopting e-learning. Therefore, there is a need for educating society members of the potential of e-learning. This may be achieved by organising awareness lectures on the advantages of e-learning or offering practical workshops of how e-learning can help in support lifelong learning.

Furthermore, the study has also found a significant influence of the students' instructor in determining their SN regarding adopting e-learning. When the students are taught by an instructor who possesses a positive attitude towards e-learning and

promotes using its tools, they would probably also develop a similar way of thinking (Volery & Lord, 2000). In addition, the students are generally influenced in their decisions by what their instructors may expect of them (Ndubisi, 2004). Thus, instructors can play an important role as change agents or catalysts in promoting the use of e-learning. Designing tasks and assignments incorporating components of e-learning such as surfing the web for information or collaborating with peers over discussion forums can encourage its adoption. Accordingly, educating the instructors with the potential of e-learning and encourage its use among them can eventually motivate the students to adopt e-learning.

8.4.7 PERCEIVED BEHAVIOURAL CONTROL

The research findings have revealed that PBC has been the most important factor influencing the students' intention to adopt e-learning as a supplementary tool and for distance education. In addition, the students' perception of control over adopting e-learning was relatively low as revealed by the descriptive statistics. The implications of these findings to encourage the adoption of e-learning amongst the students can be summarised in two points. Firstly, it would be unwise to assume that the students are in complete control over adopting e-learning in this context. Thus, it is necessary to assess the students' technology capabilities and access before making an ambitious decision to offer e-learning. Secondly, the importance of PBC implies that, to enhance the adoption of e-learning, efforts should be made to improve the students' control over adopting e-learning. This can be achieved through enhancing their internet self-efficacy, addressing issues of access to the internet and offering adequate support.

8.4.8 INTERNET SELF-EFFICACY

The students with higher internet self-efficacy perform better in internet-based learning tasks than the students with lower self-efficacy (Tsai & Tsai, 2003). As discussed earlier, self-efficacy can be an accurate predictor of performance. It influences the level of performance by enhancing the intensity and persistence of effort (Bandura, 2000). The people with high assurances in their capabilities perceive difficult tasks as challenges rather than impediments. The findings of the study have shown that internet self-efficacy is a significant factor in determining the students' perceived control over adopting e-learning. Therefore, fostering the students' self-confidence and skills of using the internet, can lead to a greater adoption of e-learning. Research has shown that training can influence self-efficacy (Torkzadeh & Van Dyke, 2002). Therefore, offering the students training on using the internet can boost the students' self-efficacy which will ultimately facilitate the acceptance of e-learning.

8.4.9 UNIVERSITY SUPPORT

The study has shown that University Support is a significant antecedent of PBC over adopting e-learning. Thus, there is a need for adequate support from the University. In order to effectively increase e-learning adoption and enhance the

students' learning performance, the University should provide its students with the necessary resources and facilities to use e-learning. This includes the provision of internet access points throughout the University campus. Additionally, technical support in the form of a help desk should be available. It is also important to ensure that technical support is available on a timely basis as the urgency of resolving problems facing the students while using e-learning tools, is critical in its adoption (Miller, Naidoo, van Belle & Chigona, 2006). The failure to provide support may result in high levels of users' apprehension in accepting the system (Nanayakkara & Whiddett, 2005).

Moreover, internet literacy training is essential to develop the required skills amongst students. Training can boost their confidence of using e-learning which, in turn, will encourage its adoption (Torkzadeh & Van Dyke, 2002). It also ensures that all existing e-learning resources will be used effectively. Thus, providing training is an essential strategy that will facilitate the adoption of e-learning by increasing the students' perception of control over adopting e-learning.

8.4.10 PERCEIVED ACCESSIBILITY

The study has found that perception of e-learning accessibility is the most important antecedent of PBC over adopting e-learning. This implies that issues of smooth internet access and the cost of internet connection, are key in formulating the students overall perception of ability to adopt e-learning. Affordability or the ability to pay for internet access has been shown to be a factor determining the number of internet subscribers (Luan et al., 2005). By charging a high rate for internet connection, the students who need to be online for extended times would be deterred from e-learning due to the service costs. Therefore, it is important to ensure that the students have adequate and inexpensive access to e-learning before implementing such systems (Chia et al., 2006). The University e-learning management should thus improve the accessibility of e-learning which would lead to greater adoption amongst the students. Offering the students affordable costs of internet connection, would encourage greater use of the internet and e-learning applications. For example, the University can work together with ISPs to provide special packages for their students. Moreover, a huge university such as KAU needs more internet access points or labs. Providing adequate access to the internet in the campus would facilitate its trial and consequently, the students would become familiar with this service and experience its advantages (Rogers, 2003).

8.4.11 IMPLICATIONS FOR MODERATING EFFECTS OF GENDER AND IE

Investigating the possible role of moderators offers information on the "boundary conditions for the relationships of interest" (Aguinis, 2004, p. 4). The findings of this study suggested that there are some differences in the relative influence of the determinants of intention, depending on gender and internet experience. Identifying the moderating effects of such variables is of great importance for the design of appropriate strategies to boost greater adoption amongst the different students segments. Diagnosing

such differences may suggest alternative ways to effectively manage the development and implementation of e-learning.

The findings have shown that gender moderates the links between intention to adopt e-learning for distance education and the perceived control over adopting it. Women showed a weaker relationship between intention and control. Thus, there is a need to address the issue of the gender gap in the use of technology which is probably still evident, at least, in the Middle Eastern contexts such as Saudi Arabia (Elnaggar, 2007). Efforts should focus on narrowing this gap by improving women's control over adopting e-learning. This can be accomplished by boosting their self-confidence in using the internet, offering training and support.

In addition, the findings that internet experience has moderating effects on the relationships between attitude and PBC on the one hand and intention on the other, imply the importance of considering special strategies to encourage the adoption of e-learning amongst the different groups of students. Since the students with low internet experience appeared to be more motivated by their attitudes regarding adopting e-learning to support their studies, efforts to foster positive attitudes amongst internet novices can also encourage this group of students to adopt e-learning. Similarly, since the findings revealed that students who perceived greater control over adopting e-learning tended to express higher intention to adopt it, especially for students with high internet experience, steps to overcome any obstacles to the adoption of e-learning, should be taken. One way of increasing the uptake of e-learning amongst those groups of students, can be through offering internet access points across the University campus to promote its use. Moreover, providing all sorts of technical support can greatly enhance the students' use of the technology. For internet-savvy users, offering special internet packages (e.g. high speed and low cost) can encourage the use of e-learning in their studies.

8.4.12 IMPLICATIONS FOR MEDIATION EFFECTS OF AT, SN AND PBC

The findings that attitude, SN and PBC mediate the effects of their salient beliefs on intention have theoretical and practical implications. Firstly, from a theoretical point of view, if the belief constructs have direct strong effect on intention (i.e. the effect is not mediated by attitude, SN and PBC), the validity of the main constructs (attitude, SN and PBC) as the only determinants of intention, is then questionable. On the contrary, if mediation exists, as is the case in this research, the model is supported and Ajzen's (2005) claim, that any other factor influences intention through these constructs, is backed up. Secondly and more importantly, from a practical point of view, since the effects of belief-based variables were mediated through the main factors (attitude, SN and PBC), it can be concluded that the three variables may offer suitable and sufficient targets for setting strategies aimed at encouraging e-learning adoption. As an example, since favourable attitudes towards adopting e-learning can lead to greater intentions to adopt e-learning, efforts to build favourable attitudes toward e-learning amongst the students can be effective in accelerating its acceptance. This is particularly important, as

the factors suggested in the research model did not (nor any other model), form a comprehensive list of all the potentially critical factors that influence the intention to adopt e-learning.

8.4.13 IMPLICATIONS FOR THE DIFFERENCES BETWEEN THE STUDENTS

The findings of the study have revealed that the students differ in their intentions to adopt e-learning for distance education when compared with selected demographics. These differences suggest designing strategies to promote and encourage the adoption of e-learning amongst the less interested groups. The University management should educate its students, instructors and the whole society with the advantages of e-learning. Such a goal can be achieved by arranging awareness campaigns on the potential of e-learning in which leaflets or brochures can be provided describing the methods on how it can help broaden and facilitate university studies.

In addition, female students who feel e-learning may limit their social life can be introduced to online chat rooms and discussion boards to encourage a sense of community. Additionally, offering hands-on experience with e-learning applications and providing training and support that involves more showcases, would also foster e-learning adoption. For example, the students may be given the chance to enlist in optional short courses that incorporate greater dependence on on-line education as a way to offer practical experience of e-learning for distance education. The more students there are in an e-learning course, the more student-generated experiences are likely to be exchanged and the more new students the course will attract. Moreover, improving accessibility to e-learning in terms of cost and quality of internet connection can encourage e-learning adoption amongst the students.

The findings also offer implications for University e-learning management, as well as ISP in that, successful advertising of internet-based products should target rural part-time male students, as this would maximise their return on investment. It is equally important that these bodies should not overlook the groups of students who showed less interest in e-learning such as married and working students. Suitable strategies should be designed to promote e-learning amongst those students. For instance, arranging informing sessions in which successful e-learners share their experiences of taking an e-learning course with other students can motivate them to try out e-learning.

8.5 CONTRIBUTION OF THE STUDY

The results of this study have some contributions to theory and practice in relation to e-learning. Firstly, in terms of theory building, this research proposed and empirically tested a model for explaining the students' adoption of e-learning. In this attempt, the study has identified, operationalised and tested a number of factors that were found directly and indirectly to play a role in explaining intention to adopt e-learning. Furthermore, the study has developed and rigorously validated an instrument for measuring students' intention and perceptions towards adopting e-learning. Moreover,

this research has expanded knowledge with regard to the topic of the adoption of technology within the Saudi context, where there has been no research on the factors influencing the adoption of e-learning amongst Saudi tertiary students to date. The findings of this study have also revealed that the TPB is a valid model to explain Saudi students' intention to adopt e-learning. Nevertheless, its explanatory power is more robust in explaining the adoption of e-learning for distance education. The study has shown that the Saudi students are not different from the Western or Asian students in relation to the factors that influence their decision to adopt e-learning. However, due to the particularity of the Saudi context (e.g. the segregating of education between sexes, restrictions on women social presence), some of the results have reflected such distinctiveness. In particular, the women in the sample have shown less interest in adopting e-learning for distance education than men. This outcome is almost opposite to what the literature has reported that women tend to favour taking up e-learning as a delivery option for continuing their distance studies (Al-Harthi, 2005). In the views of the sampled Saudi women, distance education gives them a smaller chance to socialize.

Secondly, from a practical perspective, this study has contributed to a better understanding of issues pertinent to e-learning adoption. It has also shed light on the factors that might drive or inhibit the adoption of e-learning initiatives in tertiary education. The research can be of value to University e-learning management and policy-makers in that, it offers information that would help the successful implementation of the current e-learning projects. The findings may also help in setting strategies to promote e-learning adoption amongst potential adopters. Similarly, the results of the study can be of value to e-learning systems developers and designers. For example, its findings can offer guidelines for the design of e-learning systems that would be more accepted by future e-learners.

8.6 LIMITATIONS OF THE STUDY

This study has some limitations that should be borne in mind when interpreting its findings. The main limitation is its reliance on self-report measures as the main source of gathering data. Self-report measures may be biased by social desirability. That is to say, the respondents provide socially pleasing answers, rather than truly express what they really think, believe or do (Nancarrow & Brace, 2000). This can threaten the validity and reliability of the measurement and hence, any conclusions drawn. However, as Armitage and Conner (2001) point out, this method is common in research adopting behavioural decision-making models such as TRA and TPB. In addition, Ajzen (1985) and Hartwick and Barki (1994) maintain that, just as objective methods, self-report measures are equally valid because they are more comprehensive, that is, when subjects respond to them, they tend to consider various contexts. On the other hand, objective measures are usually limited in scope, "with assessment made only in certain contexts or at certain times" (Hartwick & Barki, 1994, p. 460). Nonetheless, the respondents in this study were not asked for their names to minimise the effect of social desirability.

A second limitation in this study is the use of a cross-sectional research design to gauge perceptions regarding a fast-developing technology. The study measured perceptions and intention regarding e-learning at a single point in time. Nevertheless, perceptions can undergo change over time as individuals gain more experience and the system develops.

This study is also limited in terms of its qualitative data. Although the study adopted a mixed-method design, the qualitative aspect of this research comprised the rather smaller part. This, nonetheless, has been acknowledged since the onset of the study design. Nevertheless, the first on-line focus group was plagued with some problems that should be considered when this study is looked at. The on-line technique was very useful for the survey instrument development. It was possible to define and reveal several important aspects of e-learning and generate items to tap these definitions. Using this technique offered a timely, inexpensive approach to obtain important information. However, an asynchronous online focus group does not occur in real time in which messages are posted, viewed and responded to by participants so the method is useful in embracing slow typists, overcoming time-zone differences, and generating detailed and reflective answers (Fox et al., 2007). However, whether this method truly represents a focus group has been a topic of dispute (Bloor et al., 2001). One of the concerns of this stage was the representativeness of its sample. The issue of an easily accessed sample of individuals seriously compromised the representativeness of the sample. Despite the fact that the internet is being increasingly accessed by more and more people, especially young people, its use is still associated with specific socioeconomic status (Selwyn & Robson, 1998; Fox et al., 2007). Another major limitation was the lengthy period that the study took. The advantage of overcoming geographical barriers was soon diminished by the length of time the researcher had to wait for a sufficient amount of data. At the onset of the discussion, there were no postings for some days. This was due to final examinations as one student kindly replied. This student was very cooperative and made the effort to invite some members of the forum to participate. This was very helpful and the researcher sent a thank you message. As compared with personal interviews, the moderator or researcher has less control of the discussion and the data generated in an online context (Morgan, 1993; O'Brien, 1993). Therefore, a great deal of the information was of no use. Another limitation in this study is the relatively short list of the salient beliefs elicited from the students. It was expected to obtain more than ten salient beliefs held by the students in relation to the adoption of e-learning; however, few beliefs were reported. This was probably due to the online study situation. Yet, one can also argue that such limited set of beliefs may be a result of the novelty of e-learning itself.

Moreover, due to the nature of the internet, it was not possible to check the honesty of the participants' description of themselves. They may reveal characteristics that do not represent them in reality. For example, a female may take a male nickname or vice versa. However, because the sample was recruited from a special web site for Saudi University students, it is most likely that most participants were university students who have similar characteristics and this may have minimised any

misrepresentation concerns. In addition, this problem is not unique to online focus groups, as mailed surveys can suffer from deception too (Wright, 2006).

Moreover, the current study is limited in terms of data obtained from the follow-up interviews. Although the purpose of this qualitative stage was to shed light on any unexpected results from the main quantitative study, its extremely small sample size plagues its findings. It was initially planned to recruit over 15 students, however, due to unforeseen events (administrative difficulties and health problem), the sample was restricted to six participants. As such, the information generated from this stage was noticeably very limited, thus, the outcomes of this stage should be treated with caution. However, the study design puts greater weight on the primary quantitative phase.

Another limitation of this study is that its scope is confined to one public University in the Western coast of Saudi Arabia, a geographical area that is different in its population and some cultural aspects from the other more homogeneous and conservative areas in the country. Therefore, the results may not be generalised to the population of Saudi University students. In addition, the first phase of this research employed a sample that was drawn solely from internet users, and thus excluded participants without access to the internet. However, the goal of that phase was to elicit the students' perception about e-learning. As such, the views only reflected the perceptions of internet users. However, the review of the relevant literature may have somehow compensated for the partial views.

Another limitation is that the coefficient of determination (R^2) of the model was 20% for the intention to adopt e-learning as a supplementary tool and 41% for the intention to adopt e-learning for distance education. As Cohen (1988) stated, an R^2 of 20% explains a moderate amount of variance, while 41% is believed to be large. Therefore, the reliability of the results is suspect due to the low explanatory power of the regression model for BIS. This is indicated by the low R^2 for BIS, as well as the small beta coefficients of the independent variables in the model. These results suggest that the considered variables explain only a small share of the variation in the students' behavioural intention to adopt e-learning as a supplementary tool. Thus, the outcomes must not be rendered conclusive but rather indicative. Moreover, the relatively moderate R^2 suggests that additional variance may be explained by other critical factors that should be addressed in future research.

8.7 AVENUES FOR FURTHER RESEARCH

As the implementation of e-learning in the Saudi academia is still in its infancy phases, further research in this area is needed. In light of this study, there are a number of possible avenues for future research. Whilst this research synthesised four theoretical perspectives to propose a model to explain university students' adoption of e-learning, other external factors may also be critical. As such, the addition of other variables, as direct factors influencing intention or moderators, can extend our understanding of the factors important to the adoption of e-learning. For example, in a study by Manocha

(2006), he found that the students' learning style is an important factor to be considered in an e-learning environment. Thus, learning styles may be one important external factor in understanding the students' intention to adopt e-learning and should possibly be considered in future research.

Another direction for research could be to adopt other models for explaining the adoption of e-learning, for example, the Self-Determination Theory (Deci & Ryan, 1985); the Triandis Model of Choice (Triandis, 1977); and the Personal Computer Utilisation Model (Thompson, Higgins, & Howell, 1991).

Furthermore, another extension would be to replicate the study in other contexts (e.g. other Saudi Universities or other Arabian Gulf countries) to assess the validity of the extended research model. The sample may also be drawn from actual users and non-users of e-learning in which the results can be compared to provide an explanation for why e-learning is being adopted or not.

There is also some scope for alteration in the methodological approach. For instance, other research can adopt a more constructivist philosophical stance and use other methods for collecting and analysing the data. A study based on in-depth unstructured interviews can offer richer insights into the factors underlying adopting e-learning. Further, since e-learning has now been implemented in a few general courses, future research can still adopt a positivist stance, yet can use objective measures such as the system-logs data to assess the actual behaviour. Additionally, when the actual use of e-learning reaches the critical mass of students, future research may also extend the research model by explicitly incorporating actual usage.

In addition, the research model can be examined by applying more robust statistical techniques such as Structural Equation Modelling (SEM). A major advantage of SEM over other basic general linear models, such as regression analysis, is that dependent variables can behave as independent or predictor variables in the same theoretical model (Ullman & Bentler, 2004). In addition, because reliability of the measurement is taken into account explicitly within SEM, measurement error is estimated and removed, leaving only common variance. Thus, SEM examines relationships that are free of measurement error (Schumacker & Lomax, 2004).

8.8 REFLECTIONS ON THE FINDINGS

It is undeniably a worthwhile effort to investigate e-learning adoption amongst the students in the researcher's context. As a language teacher with a passion for technology, I once recalled asking my students to write a composition on a topic by using references from the net. Afterwards, one student complained that she could not convince her brother to go to an Internet Café. I immediately became aware of the mistake we often unconsciously make when we require something that is not in anybody's hands. Using the internet in education, as it became obvious to me, involves more than just the will of the teacher or the student. The topic of the students' use of technology in education became of further importance to me as I became a postgraduate

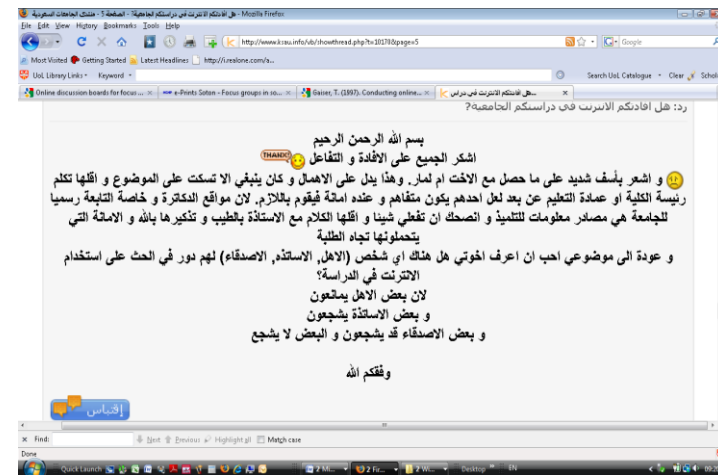
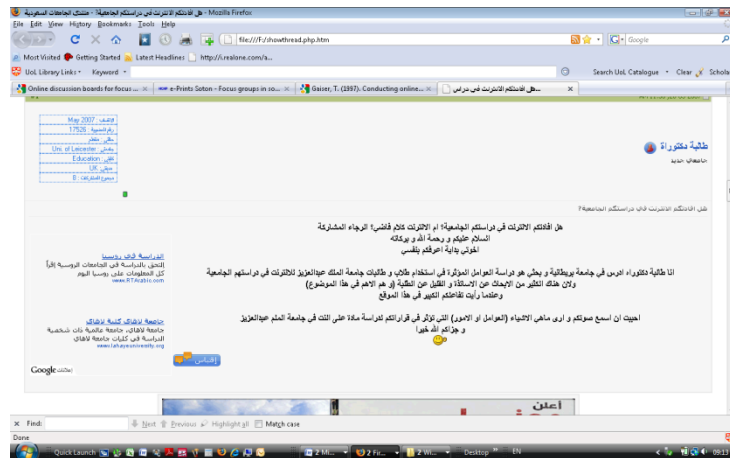
student myself in a UK University, where I found the provision of the internet for University students excellent, compared to the internet facilities my students had in the University back home. I felt that the students should be surrounded by the technology in order to successfully exploit the technology in education. However, through reading literature on IT acceptance and adoption, I became aware that other factors were also critical.

This research study has examined the students' intention to adopt e-learning in a Saudi University, where e-learning is still in its early stages. In light of this research, there are three key factors that influence the students' intention to adopt e-learning, whether as a supplementary tool or for distance education. My initial thought that, by only providing access to the internet would lead to its adoption, was one-dimensional. In light of the thesis findings, it is emphasised here that e-learning adoption requires an adequate foundation that includes, not only physical infrastructure, but also intellectual support. Additional abundant access to the internet, inside and outside of campus, has to exist for the successful adoption of e-learning. Support in the form of training and technical help will also need to be available for everyone. The findings of this study also highlighted the point, that it is perhaps important to alter the perceptions about e-learning to educate students, instructors and the society of the potential of e-learning. The issues to be accentuated include its usefulness to learning, ease of its use, the flexibility and interactivity features it offers the learning process. The findings of this thesis do support the importance of beliefs held by important individuals in the students' social circle, i.e. peers, family and instructors regarding adopting e-learning. It is hoped that the findings of this research will enlighten e-learning policies in the University, as it has enlightened me. By targeting the three key factors that determine the intention to adopt e-learning, the adoption process could sidestep many possible hurdles.



APPENDICES

APPENDIX 4A: THE INTRODUCTORY POSTING TO THE ONLINE DISCUSSION & SCREEN SHOTS FROM THE ONLINE FOCUS GROUP



APPENDIX 4B: INFORMED CONSENT FOR THE INTERVIEWS AND THE INTERVIEW SCHEDULE (ENGLISH VERSION)

Dear student,

This research has been approved, as required, by the University of Leicester and King Abdul Aziz University. You are free to withdraw from this study at any time without penalty.

All information provided by you will be kept confidential. The interview will be recorded by an MP3 device; however, the audio files will be under my possession at all times. They will be stored in my flash memory and computer and will be deleted once the thesis is accepted.

I hereby give my voluntary consent for participation in this research and to have the interview recorded.

Signature: _____

The questions:

1. In your opinion, why did male students show greater intentions to adopt e-learning for distance education than the female students?
2. In your view, why did the intisab students favour the adoption of e-learning for distance education more than the full-time students did?
3. In your viewpoint, why did students who come from outside the city favour the adoption of e-learning for distance education more than the students who reside in the city?
4. In your opinion, why did students of the Humanities show a greater liking for the adoption of e-learning for distance education than the students of the Sciences?
5. In your opinion, why did students who have job responsibilities show less liking for the adoption of e-learning for distance education than those who have no such obligations?
6. In your opinion, why did students who have family responsibilities show less liking for the adoption of e-learning for distance education than those who do not?
7. In your view, why did the students who have a DSL internet connection show more liking for the adoption of e-learning for distance education than those who have dial-up connection?

APPENDIX 4B: INTERVIEW SCHEDULE (ARABIC VERSION)

استخدام التعليم الالكتروني في الدراسة الجامعية

لقد أجريت دراسة على 531 طالب و طالبة من جامعة الملك عبد العزيز لبحث آرائهم و تصوراتهم عن التعليم الالكتروني واستخدام الانترنت كوسيلة مساندة للدراسة الجامعية أو وسيلة بديلة للدراسة التقليدية. و عند تحليل أجوبة الدراسة ظهرت بعض النتائج الغير متوقعة و لذلك استلزم الأمر العودة إلى الطلاب و الطالبات مرة أخرى لاستقصاء آرائهم بخصوص تلك النتائج الغير متوقعة.

لذلك أخي الطالب و أختي الطالبة أرجو المساعدة في الإجابة عن الأسئلة التالية كما ترون و تعتقدون و بكل تفصيل وحيث انه لا يوجد جواب مثالي بل الأهم وجهة نظركم الخاصة.

الرجاء الإجابة في الأوراق المرفقة و التأكد من ترقيم الإجابة المطابقة لكل سؤال

ولكم مني جزيل الشكر

الأسئلة

1. لماذا باعتقادك أن الطلاب اظهروا رغبة اكبر من الطالبات في استخدام التعليم الالكتروني كأداة للدراسة عن بعد؟
2. لماذا في تصورك أن طلاب و طالبات الانتساب لديهم رغبة أكثر لاستخدام التعليم الالكتروني كوسيلة للدراسة عن بعد من طلاب و طالبات الانتظام؟
3. لماذا باعتقادك أن طلاب و طالبات القرى و سكان خارج مدينة جدة اظهروا رغبة اكبر من طلاب و طالبات مدينة جدة في استخدام التعليم الالكتروني كأداة للدراسة عن بعد؟
4. لماذا في رأيك أن طلاب و طالبات الكليات و الأقسام العلمية (مثل العلوم, الطب) اظهروا رغبة أقل لاستخدام التعليم الالكتروني كوسيلة للدراسة عن بعد من طلاب و طالبات الكليات الإنسانية و الأدبية (مثل الآداب, الإدارة و الاقتصاد)؟
5. لماذا باعتقادك أن الطلاب و الطالبات ممن لديهم مسئوليات وظيفية أو تطوعية (مثلا عمل بدوام كامل أو جزئي, تجارة أو نشاط تطوعي أو خيري) اظهروا رغبة أقل من الطلاب و الطالبات الغير عاملين في استخدام التعليم الالكتروني كوسيلة للدراسة عن بعد؟
6. لماذا باعتقادك أن الطلاب و الطالبات ممن لديهم مسئوليات أسرية (مثلا رعاية أبناء أو احد الوالدين) اظهروا رغبة أقل من الطلاب و الطالبات ممن ليس لديهم مسئوليات أسرية في استخدام التعليم الالكتروني كوسيلة للدراسة عن بعد؟
7. لماذا في تصورك أن طلاب و طالبات الجامعة ممن لديهم خدمة الانترنت عن طريق DSL لديهم رغبة اكبر لاستخدام التعليم الالكتروني كوسيلة للدراسة عن بعد من الطلاب و الطالبات الذين ليست لديهم هذه الخدمة؟

APPENDIX 4C: TRANSCRIPTIONS OF THE SEMI-STRUCTURED INTERVIEWS

لان الطلاب عنهم مسؤوليات خارج البيت ومايجبون يرتبطون بدوام .
لان طلاب وطالبات الانتساب ليس متعودين على دوام وارتباط.
نظر لبعده المسافة ومشقة الطريق .

لان العلوم الطبيعية تحتاج إلى شرح اكثر ونقاش مع الدكتور وتحتاج للفهم الدقيقة بعكس الاداب .
لانهم لما يكونوا متواجدين في المنزل يكونو مشتتين الانتباه مع الاهل بعكس لما يكونوا في فصل دراسي .
لان البعض لا يستطيعون دفع التكاليف خدمة الانترنت .
لانه داخل المنزل يعني لا يحتاج لمواصلات وتكاليف دراسية ودوام رسمي .
لان الكيفية ليست معروفة وطريقة جديدة للدراسة لم تستخدم من قبل .
لانه قرار شخصي لا يتأثر بأي مميزات .

نعم

نعم

طالبة – انتظام – جده – لا – لا – ادارة واقتصاد

لكي يوفروا وقت اكبر للتسلية واللعب والسهر ويختاروا الاوقات المذاكرة متى ارادوا .
بسبب الفترة التي يدرسونها ومدتها شهر فيفضلون دراستها عن بعد افضل من دراستها في فترة قصيرة .
بسبب بعد المسافة .
لان قسم العلوم والطب يحتاج إلى تطبيق اكثر ومشاهدة فالتعليم عن بعد لا يوفر لهم ذلك .
لان الطلاب والطالبات لا يستطيعون الجمع بين وظيفة ودراسة فيفضلون ان يكون تعليمهم عن بعد ومتى ما ارادوا الدراسة استخدموا هذه الاداة وخاصة اوقات الاجازة والراحة .
لان الطلاب والطالبات الذين لديهم مسؤوليات اسرية يجد نفسه مشغولاً دائماً لا يوجد فترة راحة او اجازة فالتعليم عن بعد لن يفيد بشي مثل الانتظام في الدراسة وتخصيص وقت له .
لان هذه الخدة تتيح لهم فرصة اكبر في التصفح ووقت اكثر في استخدام النت .
لا التعليم عن بعد دراسة متطورة ولايستخدم إلا لمعرفة الطالب او الطالبة بفوائد وحضارة وهي دراسة شخصية .
لان المستخدم الانترنت يختار وقت للتصفح فيه دون ان يكون ذلك لزوم عليه اما التعليم عن بعد محدد واستخدامه للاطلاع على دروس تخص الشخص .
لانه لا يوجد هناك اقبال على هذه الدراسة .

نعم

نعم

لان الطلبة يخلطون في الطبقات منهم من يستطيع دفع تكلفة الانترنت وفهم من لا يستطيع .
طالبة – انتظام – جده – نعم – لا – اقتصاد وادارة

اعتقد بأن الطلاب ليس لديهم الحاجة لرؤية اصدقائهم يومياً بعكس الطالبات وبأن التعليم الالكتروني يفتح لهم المجال للدراسة في أي وقت .
لان طلاب الانتساب ليس لديهم الوقت الكافي ولا القدرة للحضور للجامعة لاسباب خاصة بهم .
لصعوبة حضور للجامعة كل يوم بعكس سكان نفس المدينة .
لان اقسامهم تحتاج للتعليم والتدريب العملي بعكس الاقسام الادبية .
لاتعليق

من الممكن لان لديهم مسؤوليات في المنزل لذلك من الصعب عليهم استخدام التعليم الالكتروني .

لان استخدام DSL اسهل بكثير واسرع من اتصالات الانترنت .

هذا افضل لان ذلك قرار شخصي وان تدخل الاهل يمكن ان يؤثر سلبيا على دراستهم .

لاتعليق .

لاتعليق

إلى حد ما .

نعم

اعتقد ان عدم حب التطور هو السبب في ذلك وان بإعتقادهم ان استخدام التعليم الالكتروني اصعب من التعليم

العادي .

طالبة – انتظام – جده – لا – نعم – ادارة واقتصاد

بسبب ان معظم الطالبات يب الخروج من المنزل للذهاب للجامعة اما الطلاب فيريدون تجربة شي جديد عليهم

لان معظمهم لديهم مسؤوليات في منازلهم كأن يكونوا متزوجات .

ربما لان التعليم لديهم ليس كالتليم في جده ولكن يصعب عليهم السفر إلى جده للدراسة بسبب المسكن .

بسبب صعوبة دراسة الطب والعلوم التي تحتاج للممارسة امام الطلاب .

غالبا يكون لديهم اعمال كثيرة تستصعب عليهم المسؤولية .

ربما لديهم الرغبة في الخروج من المنزل إلى الجامعة للتعليم والترفيه نبشطان الجامعة للتغلب على الضغوط

التي تكون لديهم في البيت .

بسبب سرعة الاتصال عن الاتصال العادي .

لانهم يثقون في ابنائهم ويريدونهم ان يجربوا شي جديد وتقنية حديثة في التعليم .

لان الانترنت سلاح ذو حدين والبعض يستخدم الانترنت للعب واللهو .

ان بعض الاشخاص لايتقنون استخدام الاجهزة والبعض الآخر لايجب الكمبيوتر او الجلوس عليه .

صعب في بعض الاحيان .

نعم يؤثر بدرجة كبيرة لان الكلاب ذو الاتصال العادي قد لا يكون عندهم الصبر لانتظار فتح الصفحات أما إذا

كان الاتصال سريع فهذا يسهل عليهم التعليم الالكتروني

لان التعليم الالكتروني وسيلة مستحدثة وربما لا احد يخوضها لانها غير معروفة النتائج .

طالبة – انتظام – خارج جده – لا – لا – ادارة واقتصاد .

بسبب ان الذهاب للجامعة بالنسبة لمعظم الطالبات هو المتنفس الوحيد للخروج من المنزل وتغيير جو الحياة .

انا شخصيا كنت طالبة انتساب واغلب طالبات الانتساب كزوجات او موظفات او من خارج جده فالتعليم

الالكتروني افضل لهم.

بسبب الغربة وعدم توفر السكن في جده وتركهم اعمالهم وبالنسبة للطالبات عدم وجود خيارات للسكن فالاماكن

محدودة .

بسبب صعوبة اقسامهم وتعذر الفهم في التعليم عن بعد بالنسبة لتخصصاتهم .

غالبا من لديهم وظائف هم اكبر سنا ومعتادين على تحمل المسؤولية بعكس الشباب الراغبين بالراحة والتمتع

بدلا من التعليم الجاد .

بسبب رغبتهم في التغيير والخروج من جو المسؤوليات فدراستهم بواسطة التعليم عن بعد لم يلغي مهامهم

ومسؤولياتهم في نفس الوقت بسبب تواجدهم في البيت .

لان لديهم قدرة اكبر للتعليم عن الذين ليس لديهم ، فبدون الخدمة DSL يصعب عليهم الحصول على الدروس.

لان الاسرة تريد نجاح الطالب والشهادة فقط بأي وسيلة .

لكل شخص اتجاهات معينة في دخول النت سواء للتعليم او التسلية او ضياع الوقت او التصفح .

بسبب عدم ثقة الطلاب بجدية خدمات الجامعة الالكترونية .
على حسب التخصص وامكانية الطالب في الالتزام بالدراسة بدون رقابة .
لا اعتقد ذلك .
لان معظم الطلاب لا يستخدمون النت كوسيلة تعليمية ومعظمهم يملكونه .
طالبة – انتظام – خارج جدة – لا – لا – ادارة واقتصاد

لما للطلاب من اهتمامات ومسؤوليات ونشاطات خارجية عن الجامعة اكثر من الطالبات وقد يكون دواهم في الجامعة عائق لهذه الاهتمامات الخارجية .
لان طلبة الانتساب بصفة عامة اختاروا الانتساب بسبب مشاغل قد تعيق تواجدهم في الجامعة .
لان كل الطلاب من خارج جدة اهلهم في الخارج وحياتهم الاساسية في الخارج فدراستهم او وقت الجامعة الدراسي يكون عن الالاهل والعائلة التي تكون لا اكبر دعم معنوي للطلاب في حياته كلها .
طلاب الاقسام العلمية تعتمد دراستهم على الفهم والتطبيق والمعاينة اكثر من طلاب الاقسام الاخرى الذي قد تعتمد دراستهم على محاضرة و خلاص .
باعتقادي ان بعض الاشخاص يحب التهرب قليلا من عالمه الملئ بالمهمات أي في الحية الاسرية او ممن لديهم وظائف وما إلى ذلك ، فيتجه للجامعة (من باب تغيير جو).
نفس الجواب السابق.

لانهم قد خفت عليهم بعض التصارييف .
لاتعليق كبير ولكن الاسرة تريد من ابنها التواجد معها في المنزل للجلوس سويا وليس للجلوس طوال الوقت على الانترنت والجامعة فقط .
لان الطالب او الفرد اخذ النت كوسيلة للتسلية لا للتعليم وانه متعب للنظر والظهر .
لعدم المعرفة التامة لجميع الطلاب .
احيانا

في بعض الاحيان
الانترنت اتخذ في الفرة الاخيرة كوسيلة تسلية منزلية فالطالب إذا جلس في منزله اراد التخلص من اعباء الجامعة لا لنذهب معه إلى المنزل .
طالبة – انتظام – خارج جدة – لا ولكن متزوجة بدوام كامل وام مستقبلية – لا - ادارة واقتصاد

ولذلك لان الطلاب اكثر مهارة في استخدام التكنولوجيا إلى حد كبير .
وذلك لان طالبات الانتساب لا تتوفر لديهم محاضرات مكتوبة بعكس طالبات الانتظام .
وذلك لانهم لا تتوفر لديهم وسائل مواصلات فالتعليم عن بعد مناسب لهم اكثر .
وذلك لانه في تلك الاقسام تحتاجوا إلى التطبيق العملي المباشر .
لانه الطلاب غير الشفو ليس لديهم الوقت للجلوس امام شاشات الكمبيوتر و التعلم .
وذلك لان مسؤوليات الاسرة تشغل الكبير من وقتهم فبالتالي لا يوجد وقت للجلوس على الكمبيوتر .
وذلك لانهم تتوفر لديهم الخدمة فبالتالي يسهل عليهم استخدام الانترنت .
لان ذلك قرار شخصي يعود للطالب نفسه .
ذلك لان ذلك القرار لانحتاج إلى مهارات متقدمة ي استخدام النت .
ذلك لان ذلك ليس من اهتمامات الطالبة .

نعم

نعم

ذلك لان كثير من الطالبات لاتحب هذه الطريقة في التعليم .

طالبة – انتظام – جدة – لا – لا – ادارة واقتصاد .

APPENDIX 4D: SKEWNESS AND KURTOSIS VALUES OF THE AGGREGATED SCORES

<i>Variable</i>	<i>Skewness</i>	<i>Kurtosis</i>
	Statistic	Statistic
Attitude	-1.012	.707
Subjective Norm	-.654	-.023
Perceived Flexibility	-1.251	1.315
Self-efficacy	-.326	-.673
Perceived Interactivity	-1.205	1.053
Perceived Ease of Use	-1.220	1.222
Perceived Usefulness	-.908	.504
Perceived Accessibility	-.636	-.294
University Support	-.255	-.626
PBC	-.862	.070
Peers belief	-.915	.220
Family belief	-1.913	2.552
Instructors belief	-.767	-.007
BI to adopt e-learning as a supplementary tool	-1.139	.847
BI to adopt e-learning for distance learning	-.732	-.580

APPENDIX 4E: UNIVARIATE OUTLIERS CASES WITH Z SCORES EXCEEDING ± 2.5

<i>Variable</i>	<i>Cases</i>
Attitude	11,34,81,113,219,225,283,297,302,341,429
Subjective norm	41,81,94,113,225,308,355
Perceived Ease of Use	34,45,211,272,314,355
Perceived Flexibility	81,93,108,113,142,149,236,272,297,313,361,425
Perceived Interactivity	27,42,50,72,142,211,260,297,313,422,437
Internet Experience	28,37,52,74,88,97,163,195,272
Family Influence	3,11,29,37,43,70,87,103,142,144,211,229 ,232,246,260,287,302,341,437
Behavioural Intention to adopt e-learning as a supplementary tool	30,81,142,211,241,272,286,367

APPENDIX 5A: OPERATIONALISATION OF THE RESEARCH CONSTRUCTS.

<i>Construct</i>	<i>Definition</i>	<i>Source</i>
Behavioural intention to adopt e-learning as a supplementary tool and for distance education	The subjective willingness of a student to adopt e-learning as a supplementary tool and for distance education.	Lee (2001); Huang , Wei, Yu, & Kuo (2006)
Attitude towards adopting e-learning	The degree to which a student has a favourable or unfavourable evaluation or appraisal of adopting e-learning.	Ajzen (1991)
Subjective Norm	The perceived social pressure to adopt or not to adopt e-learning.	Ajzen (1991)
Perceived behavioural control	The perceived ease or difficulty of the adopting of e-learning	Ajzen (1991)
E-learning Perceived Usefulness	The degree to which a student believes that adopting e-learning will enhance their learning performance.	Davis (1989); Lee (2006)
E-learning Perceived Ease of Use	The degree to which a student believes that the adoption of e-learning will be free of effort and easy to use.	Davis, (1989); Lee (2006)
Internet Self-Efficacy	The belief in one's capabilities to organise and execute courses of internet actions required to produce given attainments.	Eastin & LaRose, (2000)
University Support	The support provided by the university to its students to encourage the use of the internet in their studies.	Cheung and Huang (2005); Selim (2005)
E-learning Perceived Flexibility	The degree to which the student believes that adopting e-learning would provide flexibility in learning as to time, place and access to the course materials and syllabus.	Self-developed
E-learning Perceived Interactivity	The degree to which the student believes that the adoption of e-learning will enable interactive communication between the students and their instructors and among students themselves.	Self-developed
E-learning Perceived Accessibility	The degree to which e-learning is perceived as accessible to the students.	Self-developed
Peers belief about adopting e-learning	The perceived peers' pressure on the student to adopt or not to adopt e-learning.	Self-developed
Family about adopting e-learning	The perceived family pressure on the student to adopt or not to adopt e-learning.	Self-developed
Instructors about adopting e-learning	The perceived instructors' pressure on the student to adopt or not to adopt e-learning.	Self-developed

APPENDIX 5B: COVER LETTER, QUESTIONNAIRE ITEMS AND RESPONSE FORM OF THE CONTENT VALIDITY STUDY - ARABIC VERSION

نموذج تقييم فقرات اسببيان تبني التعليم الالكتروني في المرحلة الجامعية

الاسم: _____

التعليمات:

لقد تم تصميم هذا النموذج لتقييم محتوى استبيان دراستي و التي بعنوان "تبني التعليم الالكتروني في المرحلة الجامعية", الرجاء تقييم كل فقرة حسب المعايير التالية:

- الرجاء تقييم مستوى تمثيل الفقرة للسؤال الذي تقيسه باستخدام المقياس من 1 إلى 4 حيث القيمة 4 تعني "يمثل بشدة" و القيمة 1 تعني "لا يمثل أبدا". الرجاء التكرم بالتعليق على الفقرة و لماذا قيمتها بهذا الشكل.
- الرجاء تقييم مستوى وضوح الفقرة باستخدام المقياس من 1 إلى 4 حيث القيمة 4 تعني "واضحة جدا" و القيمة 1 تعني "ليست واضحة ابد". الرجاء التكرم بالتعليق على الفقرة و لماذا قيمتها بهذا الشكل.
- الرجاء تقييم فقرات الاستبيان بشك عام موضحا الفقرات التي يجب أن تحذف أو تضاف.
- أخيرا الرجاء تقييم وضوح صيغ الأسئلة.

شكرا على المشاركة

الفقرة	علاقة الفقرة	وضوح الفقرة	تعليق
1. استخدام التعليم الالكتروني فكرة جيد .			
2. استخدام التعليم الالكتروني سيوفر بيئة تعليمية جذابة .			
3. استخدام التعليم الالكتروني له آثار إيجابية على العملية التعليمية .			
4. معظم الناس المهمين لي يعتقدون انه ينبغي لي أن استخدم الانترنت في دراستي الجامعي .			
5. معظم من حولي يؤيدون استخدام الانترنت في الدراسة الجامعي .			
6. معظم الناس المهمين لي يرون انه يجب أن استخدم الانترنت في دراسي .			
7. الناس الذين اقدر آرائهم يجذبون أن استخدم الانترنت في دراستي الجامعية			
8. سيمكنني استخدام التعليم الالكتروني من إدارة وتنظيم دراستي بشكل أفضل .			
9. سيمكنني التعليم الالكتروني المرونة في اختيار المكان والزمان الذي يناسبني للدراس .			
10. سيوفر التعليم الالكتروني فرصة إكمال دراستي بدون تعارض مع مسؤولياتي الأخرى .			
1. سيجنني التعليم الالكتروني مشقة الحضور للجامعة لتلقي المحاضرات .			
2. سيوفر التعليم الالكتروني تواسلا متبادلا بين الأساتذة والطلبة عبر وسائله مثل البريد الالكتروني والمنتديات التعليمية .			
3. سيوفر التعليم الالكتروني تواسلا متبادلا فيما بين الطلبة أنفسهم عبر وسائله مثل المنتديات الخاصة بالمواد الدراسية والبريد الالكتروني .			
4. إن وسائل الاتصال في التعليم الالكتروني مثل البريد الالكتروني والمنتديات			

			أدوات فعالة للتواصل .
			5. تعلم استخدام الانترنت للأغراض الدراسية سيكون أمرا سهلا بالنسبة لـ .
			6. استخدامي للانترنت في التعليم سيكون واضحا ومفهوما بالنسبة لـ .
			7. استخدامي للانترنت في أمور الدراسة سيكون أمرا سهلا بالنسبة لـ .
			8. من السهل علي أن أصبح ماهر ماهرة في استخدام الانترنت في دراستي الجامعي .
			9. استخدامي للانترنت في التعليم سيمكنني من إنجاز مهماتي الدراسية بشكل أسرع .
			10. استخدامي للانترنت في التعليم سيجسّن من أدائي الدراسي .
			11. استخدامي للانترنت في التعليم سيعزز من كفاءتي في دراستي الجامعي .
			12. استخدامي للانترنت في التعليم سيسهل عليّ دراستي الجامعي .
			13. إنني أجد استخدام الانترنت في التعليم مفيدا لدراستي الجامعي .
			14. استخدامي للانترنت في الدراسة سيسهل الحصول على معلومات وفير .
			15. استخدامي للانترنت في الدراسة سيختصر لي الجهد والوقت .
			16. تكلفة الاتصال بالانترنت منخفضة بالنسبة لـ .
			17. تتوفر الانترنت في المنزل بسهولة .
			18. تتوفر الانترنت في الجامعة بسهولة .
			19. عند استخدامي للانترنت أجد سرعتها ممتاز .
			20. لا أواجه صعوبات تقنية أثناء استخدامي للانترنت .
			21. توفر الجامعة لطلابها وطالباتها التدريب على استخدام الانترنت .
			22. تتوفر المساعدة والدعم الفني من الجامعة عند استخدام الانترنت .
			23. تشجع الجامعة بشكل عام استخدام التعليم الالكتروني .
			24. انوي استخدام الانترنت كأداة مساندة لدراستي الجامعية مع الحضور للجامعة .
			25. انوي زيادة استخدامي للانترنت في دراستي مستقبلا .
			26. سوف استخدم الانترنت لتساعدني في دراستي الجامعية مع الحضور للجامعة .
			27. سوف ادرس بعض المواد بشكل كامل عن طريق الانترنت متى ما وفرت الجامعة خدمة الدراسة عن بعد عبر الانترنت بشكل كامل .
			28. ليس لدي مانع من الالتحاق ببعض المواد متى ما توفرت مواد تُدرس عن بعد عبر الانترنت بشكل كامل .
			29. يشجّعني أصدقائي على استخدام الانترنت في دراسي .
			30. لا تمنع أسرتي أن ستخدم الانترنت في الدراس .
			31. يحثني أساتذتي أستاذاتي على استخدام الانترنت في دراستي الجامعية .
			32. سأخذ برأي أصدقائي في الاعتبار بالنسبة لاستخدام الانترنت في دراسي .
			33. سأخذ برأي أسرتي بخصوص استخدامي للانترنت في دراسي .
			34. سأخذ برأي أساتذتي بخصوص استخدام الانترنت في الدراس .
			35. بإمكانني استخدام التعليم الالكتروني .
			36. في قدرتي استخدام التعليم الالكتروني .
			37. قدرتي على إيجاد معلومات على الانترنت باستخدام محركات البحث (.

			٨8 قدرتي على إرسال و استقبال رسائل البريد الكتروني .
			٨9 قدرتي على التعامل مع مرفقات البريد الالكتروني .
			٩0 قدرتي على المشاركة في منتديات الانترنت .
			٩1 قدرتي على تنزيل و رفع ملفات أو برامج من و إلى الانترنت .
			٩2 قدرتي على ضبط وإيصال جهاز الحاسب بالانترنت .
			٩3 قدرتي على تنصيب أو تحميل برنامج على جهاز الحاسب .

وضوح الاستبيان

- الرجاء الإشارة إلى أي فقرة ترى حذفها أو إضافتها
- الرجاء اختيار درجة وضوح أسئلة الاستبيان بشكل عام

4---3---2---1	وضوح صيغ الأسئلة

APPENDIX 5B: COVER LETTER, QUESTIONNAIRE ITEMS AND RESPONSE FORM OF THE CONTENT VALIDITY STUDY - ENGLISH VERSION.

Dear Sir,

I am currently working on my thesis titled "The adoption of e-learning at the university: Factors influencing students' intention to adopt E-Learning at a Saudi Arabian university" which is supervised by Dr. Pamela Rogerson-Revelle at the University of Leicester, UK.

You have been chosen due to your expertise in the area of e-learning. This questionnaire is developed to gauge university students' perceptions concerning e-learning and their intentions to adopt this technology in their university study. The items were adopted from previously developed measurements as well as especially developed for this study. Your expertise is requested to ensure that these items are appropriate for the constructs in which they are tapping.

The information included below will provide you with the instructions for rating the questionnaire items. Please read the instructions carefully before rating the items.

Your suggestions will be taken into consideration prior to the administration of the questionnaire. Feel free to email me if you have further questions (ka41@le.ac.uk).

Could you please once completed the form, to return it back to me via the email mentioned above.

I am most grateful for your support in this matter and I would be more than pleased to update you on the progress of my study.

Thank you for volunteering your time and expertise to assist in the development of my research instrument.

Sincerely,
Khlood R. Alserehi Alharbi
Ph. D. Student

Response Form for the Rating of the Items of the e-learning adoption model (EAM) scale

Name: _____

INSTRUCTIONS: This measure is designed to evaluate the content validity of e-learning adoption survey. Please, rate each item as follows:

- Please, by circling the appropriate number, rate the level of representativeness with respect to the research questions being measured on a scale of 1 – 4, with 4 being the most representative. Space is provided for you to comment on the item or suggest revisions.
- Please indicate the level of clarity of each item, also on a four-point scale. Again, please make comments in the space provided.
- Please, evaluate the comprehensiveness of the entire measure by indicating items that should be deleted or added.
- Finally, evaluate the level of clarity of the instructions to the participants, also on a four-point scale. Please, make comments in the space provided.

Thank you for your time and effort.

Research questions being measured	Representativeness 1 = item is not representative 2 = item needs major revisions 3 = item needs minor revisions 4 = item is clear	Clarity 1 = item is not clear 2 = item needs major revision 3 = item needs minor revisions 4 = item is clear	comments
1. I intend to adopt e-learning to accomplish a learning task whenever it has a feature to help me performing it.			
2. I intend to increase the use of e-learning in my studies.			
3. I will always try to use e-learning in as many occasions as possible.			
4. Assuming I had access to e-learning, I intend to adopt it for distance learning.			
5. Given that I had access to the e-learning system, I intend to take entirely on-line courses.			
6. Using e-learning will have positive effects on the educational process.			
7. Using e-learning will be a good idea.			
8. E-learning will provide an attractive learning environment.			
9. People who influence my behaviour would think I should use e-learning.			
10. Most of those who are around me would think I should not use e-learning.			
11. People who are important to me would think I should use e-learning.			
12. People whom opinions I value would think I should not use e-learning.			
13. How much control do you have when deciding whether or not to adopt e-learning for your studies?			
14. Whether I decide to adopt e-learning for my studies is entirely up to me.			
15. Using e-learning will allow me to accomplish learning tasks more quickly.			
16. Using e-learning system will improve my learning performance.			

17. Using e-learning will make it easier to learn course content.			
18. Using e-learning will increase my learning productivity.			
19. Using e-learning will enhance my effectiveness in learning.			
20. I find e-learning useful in my learning.			
21. Using e-learning will help me in getting a great amount of information useful for my studies.			
22. Learning to use e-learning will be easy for me.			
23. My interaction with e-learning will be clear and understandable.			
24. It will be easy for me to become skilful at using e-learning.			
25. Overall, I believe that using e-learning will be easy.			
26. A help desk is available when there is technical problem.			
27. The university provides training for using the internet.			
28. Overall, the use of the internet for our study is well supported in my university.			
29. Using e-learning will offer me flexibility in learning as to time and place.			
30. Using e-learning will save me time and effort commuting to the university.			
31. Using e-learning will allow me to continue my study while doing other responsibilities.			
32. Using e-learning will allow me control over my study.			
33. Using e-learning will enable interactive communications between the instructors and students.			
34. Using e-learning will enable interactive communications among the students.			
35. The tools used in e-learning (such as the email, discussion forums and bulletin boards) are effective ways of communication.			
36. The cost of connecting to the internet is affordable.			
37. I have an easy access to the internet at my home.			
38. It is easy to access the internet in the university.			
39. I find the speed of using the internet is excellent.			
40. I do not face any technical problems while using the internet.			
41. My friends encourage me to use e-learning.			
42. My instructors encourage me to use e-learning.			
43. My family approves that I use e-learning.			
44. I will take my friends advice regarding using e-learning.			
45. I will take my instructors advice regarding using e-learning.			
46. I will take my family view regarding using e-learning.			
47. My confidence in finding information on the World Wide Web using search engines (like Google) is...			
48. My confidence in downloading and/or uploading files through the internet is...			
49. My confidence in sending and receiving email messages is...			
50. My confidence in participating in web forums is...			
51. My confidence in connecting and starting the internet programme is...			
52. My confidence in dealing with email attachment is...			
53. My confidence in installing or setting up an application or software is...			

Comprehensiveness of the measure:

Please, evaluate the comprehensiveness of the entire measure by indicating items that should be deleted or added.

- Please, indicate which items should be deleted.
- Please, suggest items that should be added.

Instructions to participants

Please, evaluate the level of clarity of the instructions to the participants, also on a four-point scale. Please, make comments in the space provided.

Clarity of instructions	1----2----3----4
Comments	

APPENDIX 5C: CONTENT VALIDITY DATA AND CALCULATIONS

الفقرة	المحكم 1 R C	المحكم 2 R C	المحكم 3 R C	المحكم 4 R C	IRA ¹⁰ R C	CVI ⁷ R ⁸ C ⁹
1. استخدام التعليم الالكتروني فكرة جيد .	4 4	4 4	4 4	4 4	1 1	1 1
2. استخدام التعليم الالكتروني سيوفر بيئة تعليمية جذابة .	4 4	4 4	4 4	4 4	1 1	1 1
3. استخدام التعليم الالكتروني له آثار إيجابية على العملية التعليمية .	4 4	4 4	4 4	4 4	1 1	1 1
4. معظم الناس المهمين لي يعتقدون انه ينبغي لي أن استخدم الانترنت في دراستي الجامعية .	4 2	4 3	4 2	4 2	1 .75	1 .25
5. معظم من حولي يؤيدون استخدام الانترنت في الدراسة الجامعية .	4 3	4 3	4 2	4 2	1 .5	1 .5
6. معظم الناس المهمين لي يرون انه يجب أن استخدم الانترنت في دراسي .	4 1	4 1	4 2	4 1	1 1	1 0
7. الناس الذين اقدر أرائهم يحذون أن استخدم الانترنت في دراستي الجامعية	4 1	4 1	3 1	4 2	1 1	1 0
8. سيمكنني استخدام التعليم الالكتروني من إدارة وتنظيم دراستي بشكل أفضل .	4 3	4 3	3 3	4 4	1 1	1 1
9. سيمكنني التعليم الالكتروني المرونة في اختيار المكان والزمان الذي يناسبني للدراسة .	4 4	4 4	4 4	4 4	1 1	1 1
10. سيوفر التعليم الالكتروني فرصة إكمال دراسي بدون تعارض مع مسؤولياتي الأخرى .	4 4	4 4	4 4	4 4	1 1	1 1
1. سيجتني التعليم الالكتروني مشقة الحضور للجامعة لتلقي المحاضرات .	4 4	4 4	4 4	4 4	1 1	1 1
2. سيوفر التعليم الالكتروني تواصلا متبادلا بين الأساتذة والطلبة عبر وسائله مثل البريد الالكتروني والمنتديات التعليمية .	4 4	4 4	4 4	4 4	1 1	1 1

⁷ Content Validity Index Item, CVI = $\frac{\text{Numbers of experts that rated the item as 3 or 4}}{\text{Total number of experts}}$

⁸ Representative

⁹ Clarity

¹⁰ Interrater Agreement Item, IRA = $\frac{\text{Number of experts that rated the item the same}}{\text{Total number of experts}}$

1 0	1 1	4 1	4 2	4 1	4 1	3. سيوفر التعليم الإلكتروني تواصلاً متبادلاً فيما بين الطلبة أنفسهم عبر وسائله مثل المنتديات الخاصة بالمواد الدراسية والبريد الإلكتروني .
1 1	1 1	4 4	4 4	4 4	4 4	4. إن وسائل الاتصال في التعليم الإلكتروني مثل البريد الإلكتروني والمنتديات أدوات فعالة للتواصل .
1 1	1 1	4 4	4 4	4 4	4 4	5. تعلم استخدام الانترنت للأغراض الدراسية سيكون أمراً سهلاً بالنسبة لـ .
1 1	1 1	4 4	4 4	4 4	4 4	6. استخدامي للانترنت في التعليم سيكون واضحاً ومفهوماً بالنسبة لـ .
1 1	1 1	4 4	4 4	4 4	4 4	7. استخدامي للانترنت في أمور الدراسة سيكون أمراً سهلاً بالنسبة لـ .
1 1	1 1	4 4	4 4	4 3	4 4	8. من السهل علي أن أصبح ماهر ماهرة في استخدام الانترنت في دراستي الجامعية .
1 1	1 1	4 3	4 3	4 4	4 4	9. استخدامي للانترنت في التعليم سيمكنني من إنجاز مهماتي الدراسية بشكل أسرع .
1 1	1 1	4 4	4 4	4 4	4 4	10. استخدامي للانترنت في التعليم سيحسن من أدائي الدراسي .
1 1	1 1	4 4	4 4	4 4	4 4	11. استخدامي للانترنت في التعليم سيعزز من كفاءتي في دراستي الجامعية .
1 1	1 1	4 4	4 4	4 4	4 4	12. استخدامي للانترنت في التعليم سيسهل عليّ دراستي الجامعية .
1 1	1 1	4 4	4 4	4 4	4 4	13. إنني أجد استخدام الانترنت في التعليم مفيداً لدراستي الجامعية .
1 1	1 1	4 4	4 4	4 4	4 4	14. استخدامي للانترنت في الدراسة سيسهل الحصول على معلومات وفيرة .
1 1	1 1	4 4	4 4	4 4	4 4	15. استخدامي للانترنت في الدراسة سيختصر لي الجهد والوقت .
1 1	1 1	4 4	4 4	4 4	4 4	16. تكلفة الاتصال بالانترنت منخفضة بالنسبة لـ .
1 1	1 1	4 4	4 4	4 4	4 4	17. تتوفر الانترنت في المنزل بسهولة .
1 1	1 1	4 4	4 4	4 4	4 4	18. تتوفر الانترنت في الجامعة بسهولة .
1 1	1 1	4 4	4 4	4 4	4 4	19. عند استخدامي للانترنت أجد سرعتها ممتازة .
1 75	1 5	4 4	4 3	4 4	4 2	20. لا أواجه صعوبات تقنية أثناء استخدامي للانترنت .
1 1	1 1	4 4	4 4	4 4	4 4	21. توفر الجامعة لطلابها وطالباتها التدريب على استخدام الانترنت .
1 1	1 1	4 4	4 4	4 4	4 4	22. تتوفر المساعدة والدعم الفني من الجامعة عند استخدام الانترنت .
1 1	1 1	4 4	4 4	4 3	4 4	23. تشجع الجامعة بشكل عام استخدام التعليم الإلكتروني .

1	.5	.75	.5	3	4	4	4	2	4	2	34	انوي استخدام الانترنت كأداة مساندة لدراسي الجامعة مع الحضور للجامعة .	
1	1	1	1	4	4	4	4	4	4	4	35	انوي زيادة استخدامي للانترنت في دراسي مستقبلي .	
1	.25	1	.5	4	2	4	1	4	3	4	2	36	سوف استخدم الانترنت لتساعدني في دراسي الجامعة مع الحضور للجامعة .
1	.25	1	.5	4	3	4	2	4	1	4	2	37	سوف ادرس بعض المواد بشكل كامل عن طريق الانترنت مني ما وفرت الجامعة خدمة الدراسة عن بعد عبر الانترنت بشكل كاما .
1	.25	1	.5	4	3	4	2	4	1	4	1	38	ليس لدي مانع من الالتحاق ببعض المواد مني ما توفرت مواد تُدرس عن بعد عبر الانترنت بشكل كاما .
1	1	1	1	4	4	4	4	4	4	4	4	39	يشجعي أصدقائي على استخدام الانترنت في دراسي .
1	1	1	1	4	4	4	4	4	4	4	4	40	لا تمنع أسرتي أن ستخدم الانترنت في الدراس .
1	1	1	1	4	4	4	4	4	4	4	4	41	يحثني أساتذتي أستاذاتي على استخدام الانترنت في دراسي الجامعي .
1	1	1	1	4	4	4	4	4	4	4	4	42	سأخذ برأي أصدقائي في الاعتبار بالنسبة لاستخدام الانترنت في دراسي .
1	1	1	1	4	4	4	4	4	4	4	4	43	سأخذ برأي أسرتي بخصوص استخدامي للانترنت في دراسي .
1	1	1	1	4	4	4	4	4	4	4	4	44	سأخذ برأي أساتذتي بخصوص استخدام الانترنت في الدراس .
1	1	1	1	4	4	4	4	4	4	4	4	45	بإمكاني استخدام التعليم الالكتروني .
1	1	Comments: Add examples of search engines (Google)	1	1	4	4	4	4	4	4	4	46	في قدرتي استخدام التعليم الالكتروني .
1	1	1	1	4	4	4	4	4	4	4	4	47	قدرتي على إيجاد معلومات على الانترنت باستخدام محركات البحث (.
1	1	Comments: Add the term in English 'email attachment'	1	1	4	4	4	4	4	4	4	48	قدرتي على إرسال و استقبال رسائل البريد الالكتروني .
1	1	Comments: Add an example of a web	1	1	4	4	4	4	3	4	3	49	قدرتي على التعامل مع مرفقات البريد الالكتروني .

forum						
1 1 Comments: Add the term in English 'Down load and upload'	1 1	4 4	4 4	4 4	4 4	50 قدرتي على المشاركة في منتديات الانترنت .
1 1	1 1	4 4	4 4	4 4	4 4	1 قدرتي على تنزيل و رفع ملفات أو برامج من و إلى الانترنت .
1 1 Comments: Add the term 'set up'	1 1	4 4	3 4	4 4	4 4	2 قدرتي على ضبط وإيصال جهاز الحاسب بالانترنت .
1 1	1 1	4 4	4 4	4 4	4 4	3 قدرتي على تنصيب أو تحميل برنامج على جهاز الحاسب .

Representativeness Interrater Reliability for the whole scale: $53/53 = 1$

Clarity Interrater Reliability for the whole scale: $47/53 = 0.89$

Representativeness CVI for the whole scale: $53/53 = 1$

Clarity CVI for the whole scale: $45.75 / 53 = 0.86$

Data for Comprehensiveness of the measure

Please, indicate which items should be deleted

Rater #1: None

Rater #2: items 4 and 6 are repetitions.

Rater #3: No comments

Rater #4: No comments

Please, suggest items that should be added

Rater #1: There is a need to add an item on students' ownership of a personal computer because it is essential.

Rater #2: No comments

Rater #3: No comments

Rater #4: No comments

Data on Clarity of Instructions to participants

Rater # 1	Rater #2	Rater #3	Rater #4
Clarity	Clarity	Clarity	Clarity
3	4	4	4
Comments	Comments	Comments The self- efficacy instructions need more clarification or rewording.	Comments

IRA for the Instructions to Participants

Raters				
1	2	3	4	IRA
4	4	4	4	$4 / 4 = 1$

CVI for the Instructions to Participants

Raters				
1	2	3	4	CVI
4	4	3	4	$1 / 1 = 1$

APPENDIX 5D: COVER LETTER FOR THE PRE-TESTING OF THE QUESTIONNAIRE

Dear Student,

I am now working on my thesis that investigates university students' adoption of e-learning and the factors influencing it. At this stage, I am developing and validating the study questionnaire. As a part of this stage, I need your help in refining the questionnaire.

Please could you spend few minutes filling the questionnaire out, I also need to know **how long it took you to complete.**

Then could you please provide feedback on the questionnaire's **readability, clarity, errors, layout, content** and any other suggestions that could help improve it.

Thank you very much
Khlood R. Alserehi Alharbi
Ph. D. student

APPENDIX 5E: RESULTS OF FIRST FACTOR ANALYSIS

Communalities	Loadings	Extraction
se1	1.000	.585
se2	1.000	.739
se3	1.000	.752
se4	1.000	.593
se5	1.000	.703
se6	1.000	.570
se7	1.000	.642
att1	1.000	.787
att2	1.000	.806
att3	1.000	.729
sn1	1.000	.737
sn2	1.000	.741
sn3	1.000	.800
sn4	1.000	.625
pf1	1.000	.706
pf2	1.000	.754
pf3	1.000	.758
pf4	1.000	.669
pi1	1.000	.798
pi2	1.000	.823
pi3	1.000	.701
peou1	1.000	.783
peou2	1.000	.829
peou3	1.000	.886
peou4	1.000	.736
pu1	1.000	.699
pu2	1.000	.817
pu3	1.000	.815
pu4	1.000	.806
pu5	1.000	.714
pu6	1.000	.658
pu7	1.000	.697
pa1	1.000	.701
pa2	1.000	.697
pa3	1.000	.686
pa4	1.000	.660
pa5	1.000	.576
us1	1.000	.782
us2	1.000	.826
us3	1.000	.678
bis1	1.000	.849
bis2	1.000	.620
bis3	1.000	.890
bid1	1.000	.795
bid2	1.000	.788
pb1	1.000	.746
pb2	1.000	.774

Results of first factor analysis

Number of extracted factors with amount of explained variance

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	16.238	33.138	33.138	16.238	33.138	33.138	4.869	9.936	9.936
2	3.821	7.799	40.937	3.821	7.799	40.937	4.254	8.682	18.618
3	2.839	5.794	46.730	2.839	5.794	46.730	3.271	6.676	25.294
4	2.152	4.391	51.122	2.152	4.391	51.122	3.081	6.289	31.583
5	1.780	3.633	54.755	1.780	3.633	54.755	3.052	6.229	37.812
6	1.671	3.410	58.165	1.671	3.410	58.165	2.893	5.905	43.717
7	1.531	3.125	61.289	1.531	3.125	61.289	2.683	5.475	49.192
8	1.312	2.677	63.967	1.312	2.677	63.967	2.640	5.387	54.579
9	1.100	2.246	66.213	1.100	2.246	66.213	2.501	5.103	59.683
10	1.068	2.180	68.392	1.068	2.180	68.392	2.341	4.777	64.460
11	1.024	2.090	70.482	1.024	2.090	70.482	2.335	4.766	69.225
12	1.016	1.895	72.376	1.016	1.895	72.376	1.544	3.151	72.376

Results of first factor analysis

Pattern Matrix(a)

Component	1	2	3	4	5	6	7	8	9	10	11	12
se3	.806	.046	.068	.105	.096	-.012	.101	.049	.006	.009	.069	.209
se5	.804	.027	.086	.067	.063	-.019	.107	.043	.110	.043	.067	.044
se2	.789	.021	.038	.112	.078	-.047	.107	.077	.042	.023	.072	.248
se7	.750	.145	.034	.077	.120	.111	.086	.079	-.011	.004	-.024	-.056
se4	.702	-.034	.033	.080	.064	.070	.123	.004	.148	.102	.066	.162
se1	.689	.127	-.048	-.068	.137	-.021	.057	5.90E-005	.194	-.003	-.005	-.117
se6	.678	.083	.094	-.007	.108	.037	.073	.067	-.060	-.010	-.026	-.195
pa6	.093	-.017	.251	.174	-.045	.071	.010	.130	-.131	.108	.084	.039
pu2	.087	.794	.188	.096	.140	.111	.104	.098	.133	.187	.055	.158
pu3	.040	.785	.157	.102	.143	.110	.140	.146	.198	.170	.067	.129
pu4	.124	.722	.175	.183	.230	.107	.089	.211	.172	.143	.036	.183
pu1	.101	.610	.063	.339	.333	.075	.090	.163	.037	.153	.153	.012
pu5	.160	.548	.218	.184	.151	.015	.129	.313	.322	.064	.228	.026
pu6	.102	.458	.140	.259	.229	-.029	.139	.234	.074	.108	.266	-.099
sn3	.117	.068	.821	.075	.135	.023	.105	.098	.094	.099	.121	.128
sn1	.022	.114	.812	.107	.062	.100	.068	-.002	.120	.106	.040	-.043
sn2	.083	.207	.106	.043	.143	.070	.129	.089	.254	.058	.085	.113
sn4	.081	.219	.209	.194	.170	.050	.005	.124	.186	.139	.128	.033
pf3	.076	.152	.153	.739	.190	.042	.065	.202	.193	.128	.071	.147
pf2	.131	.219	.172	.706	.179	.102	.089	.089	.307	.153	.048	.038
pf4	.097	.145	.072	.701	.127	-.049	.112	.231	-.047	.064	-.028	.208
pu7	.123	.484	.077	.525	.175	.061	.163	.262	-.025	.046	.157	-.039
peou3	.217	.292	.234	.175	.746	.047	.166	.160	.171	.069	.075	.116
peou2	.210	.285	.234	.173	.711	.067	.150	.168	.166	.101	.072	.132
peou4	.273	.228	.084	.180	.694	.077	.126	.116	.162	.080	.112	.055
peou1	.236	.180	.183	.237	.681	.040	.141	.265	.170	.081	.068	.100
us2	.046	.051	.053	1.57E-005	-.004	.891	.048	.029	-.009	.068	.065	.107
us1	.078	.031	.062	-.023	-.019	.866	.016	.057	.015	.078	.081	.067
us3	.038	.071	.089	-.005	.143	.768	-.006	.111	-.008	.067	.186	.011
pa3	-.067	.126	.005	.162	.041	.664	.258	-.041	.100	.042	-.056	-.097
pa1	.134	.063	.053	.138	.122	.030	.775	.074	.093	.141	.021	.008
pa2	.274	.029	.138	-.008	.059	-.020	.733	.210	.112	.035	.028	-.026
pa4	.078	.219	.101	.089	.060	.167	.726	-.019	.084	.054	.134	.105
pa5	.345	.169	.006	.066	.264	.180	.623	-.023	.049	.079	.042	.088
pa6	.059	.026	.134	.130	.027	.075	.107	.138	.152	.141	.129	.083
pi2	.112	.254	.073	.245	.166	.098	.089	.751	.145	.116	-.009	.131
pi1	.041	.213	.101	.310	.128	.059	.068	.713	.113	.107	.039	.241
pi3	.175	.253	.115	.097	.262	.085	.098	.642	.239	.074	.083	.030
att2	.158	.187	.260	.199	.174	.008	.142	.114	.741	.051	.072	.126
att3	.059	.207	.300	.024	.163	.033	.117	.242	.667	.103	.037	-.049
att1	.217	.200	.242	.178	.255	.042	.139	.171	.625	.025	.177	.252
pf1	.135	.349	.262	.441	.156	.106	.069	.045	.462	.145	.108	.065
pbc2	-.005	.159	.094	.087	.079	.037	.105	.078	.037	.550	.098	.533
pbc1	.039	.209	.223	.028	.028	.066	.117	.095	-.002	.786	.040	.062
bis3	.032	.120	.124	.028	.018	.120	.086	.046	.077	.099	.904	-.009
bis1	.097	.059	.104	.040	.113	.127	.044	-.014	.024	.085	.884	-.014
bis2	.052	.283	.139	.110	.127	.076	.100	.218	.197	.271	.529	.181
bic2	.155	.294	.146	.289	.201	.087	.115	.240	.139	.094	.037	.671
bic1	.160	.298	.160	.285	.218	.121	.080	.225	.155	.151	.008	.653

APPENDIX 5F: RESULTS OF SECOND FACTOR ANALYSIS

Pattern Matrix(a)

Component	1	2	3	4	5	6	7	8	9	10	11	12
se5	.806	.025	.092	.062	.074	-.018	.110	.043	.045	.069	.105	.048
se3	.800	.041	.078	.119	.073	-.016	.111	.078	.010	.074	-.035	.245
se2	.779	.022	.040	.108	.081	-.051	.110	.095	.025	.076	.015	.286
se7	.753	.143	.035	.112	.092	.114	.086	.074	.006	-.023	-.006	-.076
se4	.703	-.038	.047	.063	.082	.070	.131	.018	.103	.069	.127	.174
se1	.697	.125	-.046	.121	-.041	-.017	.058	-.013	-.001	-.006	.207	-.137
se6	.690	.075	.099	.079	.026	.041	.077	.063	-.007	-.025	-.050	-.239
pu2	.084	.795	.193	.150	.092	.111	.107	.103	.187	.054	.116	.154
pu3	.037	.786	.161	.151	.102	.111	.143	.147	.171	.066	.185	.124
pu4	.119	.727	.173	.240	.187	.108	.086	.204	.144	.035	.171	.170
pu1	.102	.605	.072	.329	.348	.077	.093	.162	.154	.154	.025	-.007
pu5	.159	.554	.213	.152	.203	.019	.122	.286	.067	.227	.344	.006
pu6	.099	.460	.133	.234	.265	-.028	.133	.411	.111	.268	.092	-.117
sn3	.117	.066	.830	.130	.077	.023	.109	.107	.101	.123	.082	.122
sn1	.024	.111	.814	.057	.110	.102	.067	-.008	.109	.041	.121	-.054
sn2	.086	.207	.746	.137	.054	.073	.130	.087	.061	.084	.253	.097
sn4	.080	.210	.655	.180	.168	.047	.015	.150	.141	.132	.144	.042
peou3	.211	.297	.230	.753	.179	.049	.162	.152	.069	.072	.174	.100
peou2	.207	.285	.237	.712	.178	.068	.152	.171	.101	.070	.156	.115
peou4	.266	.230	.082	.704	.175	.078	.124	.113	.080	.111	.156	.049
peou1	.232	.183	.183	.684	.244	.042	.138	.258	.082	.067	.171	.084
pf3	.074	.149	.163	.196	.739	.044	.062	.195	.131	.074	.182	.141
pf4	.097	.148	.071	.123	.724	-.044	.103	.208	.067	-.027	-.027	.180
pf2	.130	.212	.184	.189	.697	.104	.089	.085	.156	.052	.286	.042
pu7	.125	.484	.075	.169	.547	.065	.155	.233	.050	.158	-.005	-.071
us2	.047	.051	.055	-.008	.005	.892	.049	.032	.068	.064	-.012	.099
us1	.074	.035	.053	-.013	-.023	.867	.009	.048	.079	.080	.027	.064
us3	.033	.073	.083	.153	-.016	.767	-.010	.109	.068	.187	-.007	.013
us4	-.065	.117	.019	.035	.159	.664	.264	-.032	.041	-.053	.077	-.095
pa1	.135	.059	.059	.116	.148	.031	.777	.074	.144	.023	.090	.000
pa3	.082	.208	.122	.050	.093	.166	.740	.007	.055	.137	.047	.104
pa2	.273	.028	.136	.060	-.005	-.020	.734	.210	.039	.030	.114	-.033
pa4	.340	.170	.004	.271	.065	.181	.621	-.024	.081	.042	.047	.089
pi2	.114	.250	.088	.157	.259	.097	.097	.767	.117	-.004	.128	.106
pi1	.047	.207	.122	.111	.332	.058	.079	.737	.107	.043	.089	.205
pi3	.169	.252	.119	.280	.078	.081	.104	.657	.076	.088	.216	.036
pb2	-.004	.157	.099	.071	.097	.039	.106	.078	.834	.098	.032	.032
pb1	.031	.213	.213	.045	.013	.065	.111	.091	.788	.040	-.001	.068
bis3	.031	.121	.126	.016	.030	.121	.085	.040	.100	.904	.078	-.011
bis1	.097	.054	.113	.112	.030	.125	.051	.000	.086	.886	.001	-.009
bis2	.046	.297	.124	.134	.127	.080	.086	.185	.273	.525	.233	.166
att2	.159	.189	.267	.179	.209	.012	.141	.102	.054	.071	.737	.127
att3	.056	.218	.285	.172	.040	.038	.103	.199	.106	.034	.706	-.055
att1	.214	.207	.241	.264	.189	.046	.134	.156	.027	.174	.631	.248
bid2	.155	.302	.150	.194	.321	.093	.113	.248	.095	.032	.138	.630
bid1	.157	.311	.158	.217	.317	.127	.073	.219	.153	.002	.167	.617

Extraction Method: Principal Component. Rotation Method: Oblimin with Kaiser Normalization. Rotation converged in 12 iterations.

Validity & reliability of second pilot study

Reliability

<i>Subscale</i>	<i>α</i>
BI to adopt e-learning as a supplement tool	.765
BI to adopt e-learning for distance learning	.916
Attitude	.825
Subjective norm	.869
Perceived behavioural control	.895
Internet self-efficacy	.907
Perceived Usefulness	.900
Perceived Ease of Use	.934
University Support	.819
Perceived Flexibility	.805
Perceived Interactivity	.880
Perceived Accessibility	.790
Whole scale	.952

APPENDIX 5G: THE QUESTIONNAIRE (ARABIC VERSION)

بسم الله الرحمن الرحيم

أخي الطالب \ أختي الطالبة

بين يديكم استبيان يتعلق ببحث للحصول على درجة الدكتوراه والذي يبحث في 'العوامل المؤثرة في تقبل واستخدام الطلاب والطالبات للتعليم الإلكتروني في الدراسة الجامعية' والتي أرجو أن تساعدوني بإكمالها .

ماذا يعني التعليم الإلكتروني؟

يُقصد بالتعليم الإلكتروني: استخدام تقنية الإنترنت في الدراسة الجامعية. فتستخدم وسائل الإنترنت (الشبكة العنكبوتية) المختلفة مثل المواقع الغنية بالمعلومات كالموسوعات الإلكترونية والمجلات العلمية الإلكترونية والبريد الإلكتروني والمننديات التعليمية لتدعيم وإثراء التعلم والدراسة بالإضافة إلى الانتظام بالحضور للجامعة لتلقي المحاضرات , أي تستخدم الإنترنت كعامل إضافي مساند للدراسة الجامعية والمحاضرات الأسبوعية . وقد تتيح الجامعة مستقبلًا التعليم عن بعد فتستخدم الإنترنت كوسيلة بديلة للطريقة التقليدية , أي أن الإنترنت و وسائلها المختلفة تستخدم في تقديم المواد الدراسية بشكل كامل وقد لا تطلب ذلك الانتظام بالحضور للجامعة لأخذ المحاضرات , وهذا يتيح للطلبة اختيار الوقت والمكان الذي يناسبهم للدراسة متى ما توفر لديهم وسيلة الاتصال بالإنترنت .

وتستخدم عبارة التعليم الإلكتروني في هذا الاستبيان كمرادف لاستخدام الإنترنت كوسيلة إضافية مساندة للدراسة الجامعية و ليس بديلا عن الحضور للجامعة والدراسة الحالي .

- أرجو أن تعبروا عن آرائكم بكل صدق و أمانة حيث انه لا توجد إجابة صحيحة أو خاطئة و إنما هي وجهات نظر قد تختلف ولكي تكون نتائج الدراسة مفيدة وتعكس الواقع .

و للعلم فان أية معلومات ستبقى سرية ولن يطلع عليها احد سوى الباحث .

- كما أتمنى التأكد من الإجابة على جميع الأسئلة إذ أن الإجابات الناقصة ستؤدي إلى إلغاء الاستبيان بكامله .

و أخيرا اشكر لكم تعاونكم .

١. الرجاء اختيار ما يماثل استخدامك و خبرتك بالانترنت :

مدة استخدامي للانترنت						
1	2	3	4	5	6	7
لم استخدمها أبدا	اقل من سنة	سنة	تقريبا سنتان	4 - سنوات	6 سنوات - 5	أكثر من 7 سنين

معدل استخدامي للانترنت						
1	2	3	4	5	6	7
لا استخدمها	نادرا في السنة	مرة في الشهر	عدة مرات في الشهر	مرة في الأسبوع	مرات في الأسبوع	يوميا

2. الرجاء اختيار درجة الثقة المناسبة بوضع إشارة ✓ في الخانة المناسبة :

مرتفعة	عالية	متوسطة	خفيفة	عالية جدا
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1	2	3	4	5	قدرتي على إيجاد معلومات على الانترنت باستخدام محركات البحث مثل جوجل (Google)
1	2	3	4	5	قدرتي على إرسال و استقبال رسائل البريد الالكتروني
1	2	3	4	5	قدرتي على التعامل مع مرفقات البريد الالكتروني (mail attachment)
1	2	3	4	5	قدرتي على المشاركة في منتديات الانترنت
1	2	3	4	5	قدرتي على تنزيل و رفع ملفات أو برامج من و إلى الانترنت (download and upload files).
1	2	3	4	5	قدرتي على ضبط وإيصال جهاز الحاسب بالانترنت
1	2	3	4	5	قدرتي على تنصيب أو تحميل برنامج على جهاز الحاسب (et up)

الرجاء قراءة العبارات التالية بتمعن ثم اختيار الإجابة التي تمثلك:

أوافق كلياً	أوافق	أوافق نوعاً ما	ليس لي أي فكرة	أعارض نوعاً ما	أعارض	أعارض كلياً
7	6	5	4	3	2	1
٧. الناس الذين أقدر أرائهم يحبذون أن استخدم الانترنت في دراستي الجامعية						
7	6	5	4	3	2	1
٨. سيمكنني استخدام التعليم الالكتروني من إدارة وتنظيم دراستي بشكل أفضل						
7	6	5	4	3	2	1
٩. سيمكنني التعليم الالكتروني المرونة في اختيار المكان والزمان الذي يناسبني للدراسة						
7	6	5	4	3	2	1
١٠. سيوفر التعليم الالكتروني فرصة إكمال دراستي بدون تعارض مع مسؤولتي الأخرى						
7	6	5	4	3	2	1
١١. سيجبني التعليم الالكتروني مشقة الحضور للجامعة لتلقي المحاضرات						
7	6	5	4	3	2	1
١٢. سيوفر التعليم الالكتروني تواصلاً متبادلاً بين الأساتذة والطلبة عبر وسائله مثل البريد الالكتروني والمنديات التعليمية						
7	6	5	4	3	2	1
١٣. سيوفر التعليم الالكتروني تواصلاً متبادلاً فيما بين الطلبة أنفسهم عبر وسائله مثل المنديات الخاصة بالمواد الدراسية والبريد الالكتروني						
7	6	5	4	3	2	1
١٤. إن وسائل الاتصال في التعليم الالكتروني مثل البريد الالكتروني والمنديات أدوات فعالة للتواصل.						
7	6	5	4	3	2	1
١٥. تعلم استخدام الانترنت للأغراض الدراسية سيكون أمراً سهلاً						
7	6	5	4	3	2	1
١٦. استخدامي للانترنت في التعليم سيكون واضحاً ومفهوماً بالنسبة لي						
7	6	5	4	3	2	1
١٧. استخدامي للانترنت في أمور الدراسة سيكون أمراً سهلاً بالنسبة لي						
7	6	5	4	3	2	1
١٨. من السهل علي أن أصبح ماهر ماهرة في استخدام الانترنت						
7	6	5	4	3	2	1
١٩. استخدامي للانترنت في التعليم سيمكنني من انجاز مهماتي الدراسية بشكل أسرع						
7	6	5	4	3	2	1
٢٠. استخدامي للانترنت في التعليم سيحسن من أدائي الدراسي						
7	6	5	4	3	2	1
٢١. استخدامي للانترنت في التعليم سيعزز من كفاءتي في دراستي الجامعية						
7	6	5	4	3	2	1
٢٢. استخدامي للانترنت في التعليم سيسهل عليّ دراستي الجامعية						

أوافق كلياً	أوافق	أوافق نوعاً ما	ليس لدي فكرة	أعارض نوعاً ما	أعارض	أعارض كلياً
7	6	5	4	3	2	1
١٣. إنني أجد استخدام الانترنت في التعليم مفيداً لدراستي الجامعية						
7	6	5	4	3	2	1
١٤. استخدامي للانترنت في الدراسة سيسهل الحصول على معلومات وفيرة						
7	6	5	4	3	2	1
١٥. استخدامي للانترنت في الدراسة سيختصر لي الجهد والوقت						
7	6	5	4	3	2	1
١٦. تكلفة الاتصال بالانترنت منخفضة بالنسبة لي						
7	6	5	4	3	2	1
١٧. تتوفر الانترنت في المنزل بسهولة						
7	6	5	4	3	2	1
١٨. تتوفر الانترنت في الجامعة بسهولة						
7	6	5	4	3	2	1
١٩. عند استخدامي للانترنت أجد سرعتها ممتازة						
7	6	5	4	3	2	1
٢٠. لا أواجه صعوبات أثناء استخدامي للانترنت						
7	6	5	4	3	2	1
٢١. يتوفر لدي جهاز حاسب خاص بي						
7	6	5	4	3	2	1
٢٢. توفر الجامعة لطلابها وطالباتها التدريب على استخدام الانترنت						
7	6	5	4	3	2	1
٢٣. تتوفر المساعدة والدعم الفني من الجامعة عند استخدام الانترنت						
7	6	5	4	3	2	1
٢٤. تشجع الجامعة بشكل عام استخدام التعليم الالكتروني						
أوافق كلياً	أوافق	أوافق نوعاً ما	ليس لدي فكرة	أعارض نوعاً ما	أعارض	أعارض كلياً
7	6	5	4	3	2	1
٢٥. انوي استخدام الانترنت كأداة مساندة لدراستي الجامعية مع الحضور للجامع						
7	6	5	4	3	2	1
٢٦. انوي زيادة استخدامي للانترنت في دراستي مستقبلاً						
7	6	5	4	3	2	1
٢٧. سوف استخدم الانترنت لتساعدني في دراستي الجامعية مع الحضور للجامع						
7	6	5	4	3	2	1
٢٨. سوف ادرس بعض المواد بشكل كامل عن طريق الانترنت متى ما وفرت الجامعة خدمة الدراسة عن بعد عبر الانترنت بشكل كامل						
7	6	5	4	3	2	1
٢٩. ليس لدي مانع من الالتحاق ببعض المواد متى ما توفرت مواد تُدرس عن بعد عبر الانترنت بشكل كامل						
7	6	5	4	3	2	1
٣٠. يشجعني أصدقائي على استخدام الانترنت في دراستي						

أوافق طلياً	أوافق	أوافق نوعاً ما	مضرة	أعارض نوعاً ما	أعارض	أعارض طلياً
7	6	5	4	3	2	1
١١. لا تمنع أسرتي أن تستخدم الانترنت في الدراسة						
١٢. يحثني أساتذتي أساتذاتي على استخدام الانترنت في دراستي الجامعية						
١٣. سأخذ برأي أصدقائي في الاعتبار بالنسبة لاستخدام الانترنت في دراستي						
١٤. سأخذ برأي أسرتي بخصوص استخدامي للانترنت في دراستي						
١٥. سأخذ برأي أساتذتي بخصوص استخدام الانترنت في الدراسة						
١٦. إنني استخدم الانترنت حالياً في دراستي						

١. الرجاء الإجابة عن الأسئلة التالية :

١. هل أنت ... ؟ طالب . . طالبة . .
٢. هل أنت ... ؟ انتظام . . انتساب . . تأهيلي . . أخرى حد .)
٣. هل أنت من سكان .. ؟ . . جد . . خارج جدة
٤. ملاحظ إذا كنت من خارج جدة و لكن نقيم فيها أيام الدراسة سواء في السكن أو في منزل أو مع أقارب الرجاء اختيار خارج جدة
٤. ما نوع الاتصال بالانترنت في منزلك إذا وج ؟
٥. اتصال بخط الهاتف . . DSL . . قمر صناعي . . أخرى
٥. هل لديك مسئوليات وظيفية أو تطوعية مثلا عمل بدوام كامل أو جزئي , تجار , نشاط تطوعي أو خيري . الخ من أعمال لكسب الرزق أو استثمار الوقت ؟ . . نعم . . لا
٦. هل لديك مسئوليات أسرية مثلا رعاية أبناء أو احد الوالدين ؟ . . نعم . . لا
٧. ما هي كليتك؟ . . آداب . . علوم . . إدارة واقتصاد . . أخرى

إذا كنتم تودون الاشتراك في المقابلة الشخصية بخصوص موضوع الاستبيان , الرجاء إكمال التالى :

الاسم _____ الهاتف _____ البريد الالكتروني _____

وأخيرا إذا كان لديكم أية إضافات أو تعليق الرجاء كتابتها خلف الورقة و لكم جزيل الشكر

APPENDIX 5H: THE QUESTIONNAIRE ITEMS IN ENGLISH

Please choose only one answer for the following questions.

How long have you been using the Internet?

Never used - Less than 1 year - A year - Two years - 3 to 4 years - 5 to 6 years - More than 7 years

At present, overall how often do you use the Internet?

No use - Rarely - Once a month - Several times a month - Once a week - Several times a week – daily

***In general, please rate to the extent to which you agree with each statement below.
(Please choose only one option for each statement below)***

*1= Strongly Disagree 2= Quite Disagree 3= Slightly Disagree 4= Neutral 5= Slightly Agree
6= Quite Agree 7= Strongly Agree*

	Strongly Disagree			Neutral			Strongly Agree
	1	2	3	4	5	6	7
1. I intend to adopt e-learning to accomplish a learning task whenever it has a feature to help me performing it.	1	2	3	4	5	6	7
2. I intend to increase the use of e-learning in my studies.	1	2	3	4	5	6	7
3. I will always try to use e-learning in as many occasions as possible.	1	2	3	4	5	6	7
4. Assuming I had access to e-learning, I intend to adopt it for distance learning.	1	2	3	4	5	6	7
5. Given that I had access to the e-learning system, I intend to take entirely on-line courses.	1	2	3	4	5	6	7
6. Using e-learning will have positive effects on the educational process.	1	2	3	4	5	6	7
7. Using e-learning will be a good idea.	1	2	3	4	5	6	7
8. E-learning will provide an attractive learning environment.	1	2	3	4	5	6	7
9. People who influence my behaviour would think I should use e-learning.	1	2	3	4	5	6	7
10. Most of those who are around me would think I should not use e-learning.	1	2	3	4	5	6	7

11. People who are important to me would think I should use e-learning.	1	2	3	4	5	6	7
12. People whom opinions I value would think I should not use e-learning.	1	2	3	4	5	6	7
13. How much control do you have when deciding whether or not to adopt e-learning for your studies?	1	2	3	4	5	6	7
14. Whether I decide to adopt e-learning for my studies is entirely up to me.	1	2	3	4	5	6	7
15. Using e-learning will allow me to accomplish learning tasks more quickly.	1	2	3	4	5	6	7
16. Using e-learning system will improve my learning performance.	1	2	3	4	5	6	7
17. Using e-learning will make it easier to learn course content.	1	2	3	4	5	6	7
18. Using e-learning will increase my learning productivity.	1	2	3	4	5	6	7
19. Using e-learning will enhance my effectiveness in learning.	1	2	3	4	5	6	7
20. I find e-learning useful in my learning.	1	2	3	4	5	6	7
21. Using e-learning will help me in getting a great amount of information useful for my studies.	1	2	3	4	5	6	7
22. Learning to use e-learning will be easy for me.	1	2	3	4	5	6	7
23. My interaction with e-learning will be clear and understandable.	1	2	3	4	5	6	7
24. It will be easy for me to become skilful at using e-learning.	1	2	3	4	5	6	7
25. Overall, I believe that using e-learning will be easy.	1	2	3	4	5	6	7
26. A help desk is available when there is technical problem.	1	2	3	4	5	6	7
27. The university provides training for using the internet.	1	2	3	4	5	6	7
28. Overall, the use of the internet for our study is well supported in my university.	1	2	3	4	5	6	7
29. Using e-learning will offer me flexibility in learning as to time and place.	1	2	3	4	5	6	7
30. Using e-learning will save me time and effort commuting to the university.	1	2	3	4	5	6	7
31. Using e-learning will allow me to continue my study while doing other	1	2	3	4	5	6	7

responsibilities.							
32. Using e-learning will allow me control over my study.	1	2	3	4	5	6	7
33. Using e-learning will enable interactive communications between the instructors and students.	1	2	3	4	5	6	7
34. Using e-learning will enable interactive communications among the students.	1	2	3	4	5	6	7
35. The tools used in e-learning (such as the email, discussion forums and bulletin boards) are effective ways of communication.	1	2	3	4	5	6	7
36. The cost of connecting to the internet is affordable.	1	2	3	4	5	6	7
37. I have an easy access to the internet at my home.	1	2	3	4	5	6	7
38. It is easy to access the internet in the university.	1	2	3	4	5	6	7
39. I find the speed of using the internet is excellent.	1	2	3	4	5	6	7
40. I do not face any technical problems while using the internet.	1	2	3	4	5	6	7
41. My friends encourage me to use e-learning.	1	2	3	4	5	6	7
42. My instructors encourage me to use e-learning.	1	2	3	4	5	6	7
43. My family approves that I use e-learning.	1	2	3	4	5	6	7
44. I will take my friends advice regarding using e-learning.	1	2	3	4	5	6	7
45. I will take my instructors advice regarding using e-learning.	1	2	3	4	5	6	7
46. I will take my family view regarding using e-learning.	1	2	3	4	5	6	7

	No confidence	low	average	high	very high confidence
1. My confidence in finding information on the World Wide Web using search engines (like Google) is...	1	2	3	4	5
2. My confidence in downloading and/or uploading files through the internet is...	1	2	3	4	5
3. My confidence in sending and receiving email messages is...	1	2	3	4	5

4. My confidence in participating in web forums is...	1	2	3	4	5
5. My confidence in connecting and starting the internet programme is...	1	2	3	4	5
6. My confidence in dealing with email attachment is...	1	2	3	4	5
7. My confidence in installing or setting up an application or software is...	1	2	3	4	5

APPENDIX 6A: RESULTS OF MAIN STUDY FACTOR ANALYSIS

<i>Kaiser-Meyer-Olkin Measure of Sampling Adequacy.</i>		.927
<i>Bartlett's Test of Sphericity</i>	<i>Approx. Chi-Square</i>	16257.336
	df	946
	Sig.	.000

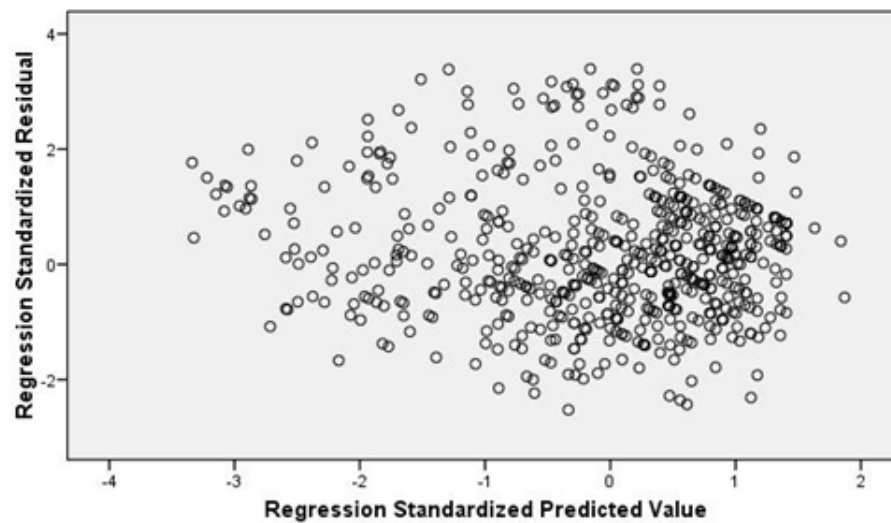
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	15.337	33.342	33.342	15.337	33.342	33.342
2	3.722	8.092	41.434	3.722	8.092	41.434
3	2.772	6.025	47.459	2.772	6.025	47.459
4	2.145	4.663	52.122	2.145	4.663	52.122
5	1.724	3.748	55.870	1.724	3.748	55.870
6	1.652	3.592	59.462	1.652	3.592	59.462
7	1.379	2.997	62.459	1.379	2.997	62.459
8	1.288	2.801	65.260	1.288	2.801	65.260
9	1.181	2.351	67.610	1.081	2.351	67.610
10	1.070	2.326	69.787	1.070	2.326	69.787
11	1.019	2.215	71.910	1.019	2.215	71.910
12	1.009	2.193	73.819	1.009	2.193	73.819

Component	1	2	3	4	5	6	7	8	9	10	11	12
pu2	.807	.031	.031	.093	-.012	.016	.116	-.047	-.013	-.015	.024	-.086
pu3	.785	-.028	.031	.047	.004	.059	.087	-.041	.039	-.090	.018	-.054
pu4	.687	.037	.037	.060	-.034	-.013	.052	.033	.092	-.061	.127	-.095
pu1	.496	.010	.000	-.040	.107	-.008	.073	.241	.034	.090	.267	.087
pu5	.464	.080	-.051	.096	.188	.042	-.058	.072	.208	-.252	-.012	.062
pu6	.459	.004	-.100	.033	.236	.062	.010	.130	.359	.028	.121	.192
se5	-.032	.800	-.036	.053	.051	.040	.013	.040	.000	-.066	-.030	-.035
se3	.003	.766	-.036	.054	.052	.049	-.029	.005	.033	.101	.057	-.236
se7	.079	.757	.102	-.005	-.053	.000	.008	.060	.030	.048	.042	.106
se2	-.017	.742	-.069	.004	.058	.053	-.017	.012	.055	.042	.041	-.277
se6	.022	.708	.030	.100	-.049	.012	-.015	.006	.042	.096	.021	.256
se1	.100	.697	-.028	-.108	-.021	-.010	-.015	-.069	-.053	-.194	.069	.146
se4	-.113	.683	.059	-.018	.047	.060	.098	.056	-.032	-.108	-.011	-.158
us2	.013	.040	.902	.028	.017	-.010	-2.06E-005	-.025	.025	.032	-.053	-.087
us1	-.016	.078	.880	.015	.035	-.057	.030	-.049	.045	-.017	-.062	-.049
us3	-.036	-.008	.764	.025	.138	-.090	.016	-.074	.088	.046	.149	.020
us4	.063	-.108	.654	-.019	-.094	.230	-.026	.158	-.069	-.060	-.010	.117
sn3	-.061	.033	-.032	.869	.048	.047	.008	-.030	.032	.049	.051	-.082
sn1	.011	-.015	.055	.861	-.031	.001	.032	.057	-.091	-.018	-.034	.093
sn2	.096	.000	.018	.736	.007	.056	-.022	-.054	-.002	-.149	.039	-.046
sn4	.057	.010	-.006	.633	.062	-.077	.075	.072	.060	-.032	.095	.022
bis3	.007	-.021	.039	.032	.941	.046	-.001	-.008	-.016	-.027	-.080	.036
bis1	-.077	.033	.049	.028	.920	.002	-.002	-.006	-.066	.060	.068	.031
bis2	.156	-.037	.006	-.025	.509	.011	.191	.026	.105	-.168	.026	-.109
pa1	-.054	-.029	-.040	-.010	-.009	.799	.081	.078	.019	-.025	.055	.028
pa2	-.082	.128	-.079	.085	-.002	.758	-.006	-.102	.202	-.051	-.028	.059
pa3	.140	-.062	.088	.054	.104	.749	.001	.025	-.065	.011	-.034	-.068
pa4	.072	.179	.117	-.090	-.003	.589	.044	-.021	-.119	.020	.266	-.054
pb2	-.026	-.020	-.020	-.051	.040	.014	.908	.049	-.005	.003	.006	.035
pb1	.054	.022	.008	.084	-.033	.016	.878	-.052	.012	.045	-.031	.002
pf3	-.070	-.004	.011	.063	.044	-.031	.066	.732	.079	-.119	.093	-.057
pf4	-.006	.040	-.070	.022	-.046	.046	.017	.723	.122	.096	.030	-.113
pf2	.013	.063	.065	.073	.017	-.016	.079	.703	-.052	-.232	.072	.039
pu7	.358	.062	.001	-.004	.135	.078	-.040	.492	.136	.108	.041	.148
pi2	.035	.022	.080	-.021	-.062	.033	.069	.087	.804	-.037	.022	-.016
pi1	.015	-.044	.038	.040	-.005	.033	.023	.169	.773	.011	-.032	-.126
pi3	.033	.047	.053	-.010	.029	.029	.033	-.111	.672	-.127	.197	.048
att2	.036	.056	-.020	.106	.025	.055	-.015	.143	.001	-.730	.058	-.065
att3	.054	-.031	.010	.126	-.022	.018	.071	-.047	.135	-.702	.063	.122
att1	.048	.081	.006	.078	.128	.043	-.060	.085	.052	-.593	.168	-.187
peou3	.060	-.022	-.017	.093	-.011	.039	.005	.000	-.006	-.031	.859	-.020
peou4	.001	.062	.023	-.064	.046	.004	.033	.031	-.030	-.043	.814	.022
peou2	.060	-.017	.003	.112	-.013	.034	.020	-.004	.025	-.010	.804	-.040
peou1	-.064	.012	-.011	.063	-.005	.031	-.016	.071	.140	-.030	.765	-.012
bid2	.226	.038	.055	.057	-.022	.048	.008	.185	.162	-.048	.109	-.577
bid1	.225	.046	.091	.054								

APPENDIX 6B: SCATTER PLOTS PRODUCED FROM THE REGRESSION ANALYSES

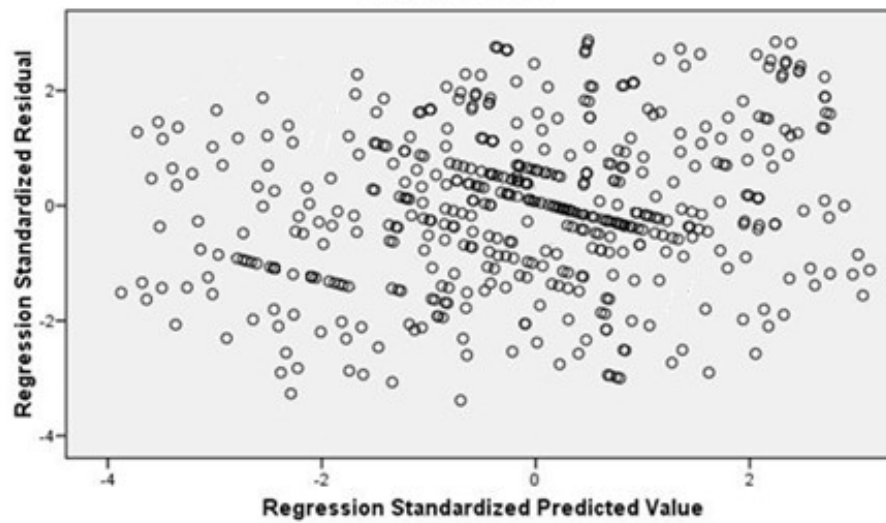
Scatterplot

Dependent Variable: Behavioural Intention to adopt e-learning for distance learning



Scatterplot

Dependent Variable: Behavioural Intention to adopt e-learning as a supplement tool



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