Developing and Testing Policy for Effective Use of ICT in Saudi Arabian Universities

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DECLARATION

This work has not been previously submitted for a degree or diploma in any university. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made in the thesis itself.

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Fahad Alturise

DEDICATION

To my family

My mother, who is the source of light in my life.

My lovely wife, who sacrificed and still sacrifices much for me so that I can finish this work.

My sweet flowers, Mohammed and Ibrahim.

To my advisor

Associate Professor Paul Calder, who helped me a lot not only with this project but also with his patience and wisdom.

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ABSTRACT

Due to its far reaching influence on many functions of education institutions and its potential benefits for educators and students, Information and Communications Technology (ICT) has become a topic of much interest in the educational community. ICT in the workplace can help a business improve its productivity. Many organisations now rely on ICT to manage their internal activities as well as other communication and business processes and procedures. University education is one of the most important methods for helping develop a country and its people. One country that must improve its education system is Saudi Arabia.

The first purpose of this thesis was to investigate the challenge of using ICT for students, faculty members and administrative staff in Saudi Arabian universities. The thesis explores the most important barriers that these stakeholders face and compares ICT use between Saudi Arabia on one hand, and the Gulf States - Qatar, Oman, United Arab Emirates (UAE) and Bahrain – on the other, with a view to discovering the main challenges which have affected effective ICT adoption in Saudi Arabian universities. Both quantitative and qualitative methods were employed to collect data from ten universities in Saudi Arabia and five universities in the Gulf States. The study found there are significant barriers that impede the full adoption and utilisation of ICT in Saudi universities compared to Gulf States universities. The results suggest that Saudi Arabian universities lack proper ICT infrastructure, including the provision of suitable connection networks and formal training of staff in utilising ICT resources in contrast with Gulf States universities. Also, low ICT skills and lack of motivation are significant challenges that compromises stakeholders' ability to employ available ICT effectively and extends to other problems.

The second purpose of this thesis was to propose strategies to overcome these challenges and make recommendations for ICT integration in universities in Saudi Arabia. An interim report of the proposed solutions was validated by ICT professionals and experts in Saudi Arabian universities, and feedback was incorporated into a final report. Proposed strategies include both cultural solutions, such as attractive incentives and up-to-date policies and rules, and technical solutions, such as comprehensive ICT usage monitoring, high-quality online training and universal access to ICT infrastructure.

The major contribution of this study is to suggest how ICT use can be increased and made more effective in Saudi Arabia's universities. This study's findings aim to advise the Saudi Arabian

and Gulf States' universities about their plans, policies and programmes for implementing ICT and the consolidation of required resources.

PUBLICATIONS

The following academic publications emerged from this PhD dissertation.

Journal Publications

- Alturise, F., Calder, P. & Wilkinson, B. 2014, 'E-mail use by the faculty members, students and staff of Saudi Arabian and Gulf states Universities', *International Journal of Advanced Computer Science and Applications (IJACSA)*, vol. 5, no. 9, pp. 123-128.

Conference Papers

- Alturise, F., Calder, P. & Wilkinson, B. 2016, 'A Comparison of ICT infrastructure in Saudi Arabian and Gulf States Universities', *SAI Computing Conference 2016*, July 13-15, 2016, London, UK.
- Alturise, F. & Calder, P. 2016, 'Effective Use of ICT in Saudi Universities: Problems and Solution Strategies', *2016 International Conference on e-Commerce, e-Administration, e-Society, e-Education, and e-Technology*, April 6-8, 2016, Chulalongkorn University, Bangkok, Thailand, ISSN 2074-5710, Published by Knowledge Association of Taiwan, pp. 171-186.

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ABBREVIATIONS

ADSL	Asymmetric Digital Subscriber Line
CITC	Communication and Information Technology Commission
DL	Distance Learning
E-business	Electronic Business
E-commerce	Electronic Commerce
E-government	Electronic Government
E-learning	Electronic Learning
E-services	Electronic Services
GCC	Gulf Cooperation Council
HEI	Higher Education Institution
IT	Information Technology
ICT	Information and Communication Technology
ITP	Information Technology Plan
KACST	King Abdulaziz City for Science and Technology
LMS	Learning Management System
MCIT	Ministry of Communications and Information Technology
ME	Middle East
MOHE	Ministry of Higher Education
MS	Microsoft Office
NCeDL	National Centre of E-learning & Distance Learning
PC	Personal Computer
PD	Professional Development
SACM	Saudi Arabian Cultural Mission
Sd.	Standard Deviation
Sig.	Statistical Significance
SPSS	Statistical Package for Social Sciences
STC	Saudi Telecom Company
UAE	United Arab Emirates
X^2	Chi-square Test

CHAPTER 1 INTRODUCTION

1.1 Introduction

Because of its far reaching influence on many aspects of educational institutions and its potential benefits for educators and students, ICT has become a topic of much interest within the educational community. Information and communication Technologies (ICTs) continue to revolutionise education worldwide. They are a major driving force of globalisation, with a profound impact on teaching and learning in Higher Education Institutions (HEIs). University learning is one of the most important strategies that can help develop a country and its people (Lai et al., 2016). One country needing to improve its education system is Saudi Arabia (Ismail et al., 2016).

The extent and effectiveness of ICT deployment and use in the Saudi Arabian university sector is well behind that in comparable institutions in developed countries such as the US, the European community, and Australia. This difference arises from many factors, including limitations in infrastructure at both university and national levels, cultural expectations amongst staff and students, and community attitudes. Although Saudi Arabia is a wealthy country because of its natural resources, access to the Internet has only recently become widely available. Furthermore, the strict application of Islamic law has led to a gender-segregated education system, which has far-reaching effects on the educational environment that can be at odds with the open-access culture typical of many other countries.

This thesis aims to identify in detail the effect of these and other factors, with a view to proposing how Saudi Arabian universities can best position themselves to more fully realise the potential of ICT. The key deliverable is a report that identifies the barriers to ICT use in the university sector, investigates possible strategies for overcoming these barriers, and suggests the way forward.

1.2 Statement of the Problem

Saudi Arabia is a leading producer of the world's oil and natural gas (Abu Nadi, 2012; Dreger & Rahmani, 2014), a member of the group of twenty (G-20), and has the largest and fastest growing ICT marketplace in the Arab region, including computer hardware and software. However ICT activities in Saudi universities are not keeping pace with

the overall growing ICT marketplace (AlGhamdi, 2012; Al Gamdi & Samarji, 2016). The case is similar in the other Gulf Cooperation Council (GCC) countries. The countries of this regional interest group include Saudi Arabia, the United Arab Emirates (UAE), Oman, Qatar, Kuwait, and Bahrain. This region is classified as one of the richest regions in the world as it produces almost a half of the world's supply of oil. However, ICT in the universities of this cooperative group of countries is still in its early stages (AlGhamdi, 2012; Al Gamdi & Samarji, 2016). The problem addressed in this study was the disconnect between ICT and the universities' goals, which is reflected in poorly managed, abandoned, and failed business technology projects.

The foundational problem of this study was defined by the absence or poor use of ICT in higher education among students, faculty members and administrative staff, and the lack of a mechanism to understand and assess barriers or problems (Alkhalaf, 2013; Al Gamdi & Samarji, 2016). Moreover, the factors affecting ICT in higher education were not adequately understood or defined. The focus of the present study is "Developing and Testing Policy for Effective use of ICT in Saudi Arabian Universities". It is hoped that the study will provide an insight into how far university stakeholders have been able to keep up with advances in information communication technologies, their professional development activities, whether their training in ICT has helped them in handling the latest technologies, and their need for further education and training in the profession.

1.3 Purpose of the Study

The puzzle of why Saudi Arabia lags behind other wealthy countries in ICT in universities, and how to change this situation, can be addressed more satisfactorily by using a broader framework than that used in the past (Alkhalaf, 2013). Such an approach, which would yield more than a simple list of inhibitors and facilitators, could also be used in the future by other researchers to study similar situations in other countries and make recommendations, such as those proposed in this study for Saudi Arabia.

The purpose of this qualitative and quantitative research was first to identify, list, and describe the most important barriers inhibiting the use of ICT in Saudi universities and subsequently to suggest remedial strategies. With a better understanding of these barriers, future researchers may then be able to examine them and implement strategies

to support and overcome problems and enable the universities to develop a distinctive competitive advantage. Second, through this study, the researcher will list and describe the strategies that universities use as a guide to ICTs and organisational goals. These strategies are tools for incorporating universities' goals as part of the process. Through this process, university organisational units create the environment in which they can accept or reject the current system and employ better technology.

This research addresses a gap in the existing knowledge about using ICT in Saudi universities: why is ICT not used effectively in most of Saudi universities when compared with its use in other Gulf State countries that have similar cultural and economic contexts? The outcomes of this research include a roadmap that identifies the challenges facing Saudi universities in using ICT effectively and recommendations for some solutions that may help them to overcome those barriers. These outcomes might also be useful to other government organizations in Saudi Arabia and to other universities in different countries that share similar characteristics.

1.4 Research Objectives

The objectives of this study were to:

- Identify and describe the barriers that affect students, faculty members and administrative staff using ICT in Saudi Arabian universities.
- Explore and describe the experiences of students, faculty members and administrative staff in Gulf States universities.
- Make recommendations and solutions for using ICT in Saudi Arabian universities (by addressing the barriers and university experiences).
- Validate the solution strategies to evaluate the effectiveness or otherwise of the proposed solution strategies identified.

1.5 Research Questions

The study investigated the general barriers (technical and non-technical) to the adoption of ICT and its dissemination in Saudi Arabian universities and strove to investigate any possible cultural or regional-specific obstacles to the uptake of ICT in these universities. A segment of the university population was investigated to describe possible variables and factors in universities and propose solution strategies according to the documented barriers and experiences in previous studies. A group of officials in

the universities was interviewed to gather their perceptions, plans, achievements and problems encountered in the development and dissemination of ICT in Saudi Arabian universities, with a view to validating these strategies.

The main research question is: How can universities' stakeholders in Saudi Arabia use ICT effectively? This main question was broken down into secondary research questions that were explored in several phases of the study, as discussed in following sections.

Phase One:

Q 1.1: Why is ICT not used in Saudi Arabian universities to the same extent as it is in universities in developed countries, or even in neighbouring Gulf States such as Oman, Qatar, United Arab Emirates and Bahrain?
Q 1.2: What are the most important barriers that might affect the adoption of information and communication technology in Saudi Arabian universities?
Q 1.3: Is there a difference between Saudi Arabian universities and universities in Gulf States in terms of faculty, students and staff in relation to

- Their attitudes toward ICT?
- The barriers they have encountered?
- Their experience with technologies?

Phase Two:

Q 2.1: What are the main barriers that affect students, faculty members and staff using ICT in Saudi Arabian universities?
Q 2.2: Who are the main stakeholders who may help to implement solutions to overcome the barriers?
Q 2.3: What solutions for using ICT in Saudi Arabian universities can help to overcome the barriers?

Phase Three:

Q 3.1: Can ICT solutions and strategies used in universities in other developed or developing countries be applied in Saudi Arabian universities?

Q 3.2: How should approaches that are successful elsewhere be adapted to suit the unique requirements of the Saudi Arabian education system?

These sub-questions provided scope to answer the main question through the research tools selected for the study.

1.6 Research Methodology Overview

Systematic research is the most appropriate means to investigate facts and ideas, to gain new knowledge and to interpret events. Trends and tendencies can be established which help to predict future needs. Moreover, it is the most important way forward for socio-economic development and revitalisation in modern times (Creswell, 2013). According to Mertens (2014) research is one of many different ways of knowing and understanding.

A mixed method approach which seeks to find quantitative and qualitative data to illuminate and develop our understanding of a context is the methodology used in this study. Any one or combination of these paradigms may influence researchers' decisions. Indeed, the literature shows that there is a long debate and there is no agreement about exclusivity of approach in research, so any given study can reflect one or more than one approach (Cohen et al., 2011; Mertens, 2014). In this situation researchers must be as clear as possible about their selection of the problem and their procedures for explaining or resolving it. The choice of paradigm, according to Creswell (2013), results from the problem of the study and the capacities of the researcher and the respondents. Creswell's three considerations led to a pragmatic paradigm for this study (mixing data collection methods and data analysis procedures).

The explanatory design is one of the four major types of mixed method which will be the design used in this research. It is a two-phase mixed methods design. In an explanatory sequential design, the researcher first collects and analyses quantitative data, then the findings inform qualitative data collection and analysis. The overall purpose of this design is that qualitative data helps explain or build upon initial quantitative results (Creswell & Clark, 2011). This design starts with the collection and analysis of quantitative data. This first phase is followed by the subsequent collection and analysis of qualitative data. The second, qualitative phase of the study

is designed so that it follows from (or connects to) the results of the first quantitative phase. Because this design begins quantitatively, investigators typically place greater emphasis on the quantitative methods than the qualitative ones.

An explanatory mixed methods design was selected for this study, in which both quantitative and qualitative data are collected (Creswell, 2013). In the mixed methods approach, the researcher aims to achieve greater validity through combining both approaches (Creswell, 2013; Creswell & Clark, 2011). The design approach is therefore appropriate to determine convergence of perspective and corroboration of results from the different viewpoints of faculty members, staff and students, and was thus selected for this study.

The explanatory method refers to mixing quantitative and qualitative approaches of research and data, and employing multiple data sources in a study, which was used in this study. A quantitative approach was used in Phase 1 of the study and a qualitative approach was used in Phase 3 of the study. Using the explanatory method and data will provide a more comprehensive picture of the factors contributing to the situation in Saudi Arabia's universities. According to Creswell (2013), the purpose of the explanatory method is to provide a basis for convergence to the truth. Creswell (2013:224) states that "The explanatory sequential mixed methods approach is a design in mixed method that appeals to individuals with a strong quantitative background or from field relatively new to qualitative approaches".

The focus of this research is on policy development and testing using a rational policy analysis approach (Dunn, 2015). Specifically, the research uses a policy cycle model modified to take into account the resource constraints imposed by a PhD research context, where actual implementation of policy is not feasible. The modified model divides the policy development process into a series of stages, as shown in Figure 1-1. The first stage is problem identification, in which the need for policy development is established. The second stage is data collection and analysis of the data to identify the barriers to development of the policy. The policy strategy proposal stage then proposes some solutions which may help to overcome these barriers, and the evaluation stage considers how effective these strategies would be. Finally, the proposed solution strategies are revised and rewritten in light of the results of the evaluation.

Figure 1-1 Modified policy development cycle

This section presents a brief outline of the methodology employed in this study, and explains the research design and methods used to explore the development of policy to improve the extent and effectiveness of ICT deployment and use in the Saudi Arabian university sector. In line with the policy cycle model, the research was conducted in four phases and the research methodology will thus be discussed under these four phases. In this thesis, the structure is very different to that of a traditional thesis structure. To understand this more easily, each phase is described in a separate chapter and a complete description of the methodology used for the phase is presented in the methodology section of the relevant chapter. An outline is presented here so that the reader can gain an appreciation of the work undertaken and the order in which it was done. Figure 1-2 presents an overview of the approaches to this research.

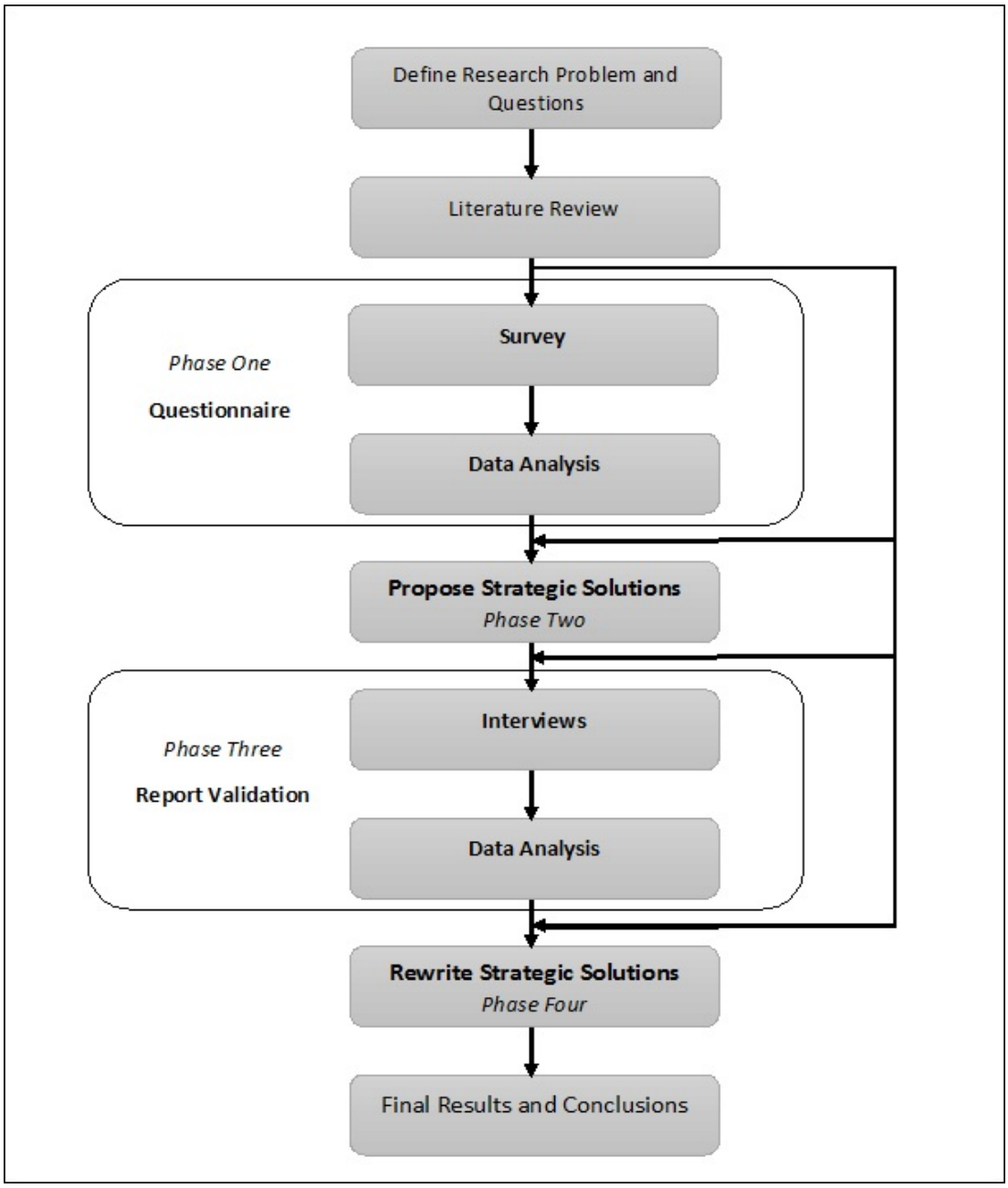

Figure 1-2 Overview of the research methodology process flowchart

To effectively answer the research questions above, a four-phase approach was adopted, and it is explained in more detail below.

Data Collection "Questionnaire" (Phase one)

This phase focused on gathering data by questionnaire from students, faculty members and staff in Saudi and Gulf-State universities. The research started with the identification of the research problem and questions, and a review of the literature. Data in the first stage employed a quantitative approach incorporating a sequential

explanatory design for adequately answering research questions Q 1.2, Q 1.2 and Q 1.3.

Interim Solutions Strategies Report (Phase two)

The second phase developed an interim solutions strategies report based on analysis of literature and the results of phase one, effectively addressing research questions Q 2.1, Q 2.2 and Q 2.3. Both the questionnaire (Phase one) and literature review use data that was needed to write the results of this phase.

Report Validation "Interview" (Phase three)

The third phase employed a qualitative method to validate the solution strategies that were developed in phase 2 by interviewing the ICT professionals and experts in Saudi Arabia's universities. This phase (together with the Phase two strategies solutions report) served to inform the development of a final report used in the following phase (Phase four).

Final Solutions Strategies Report (Phase four)

The fourth phase consolidated the results of the previous stages by rewriting the proposed solutions strategies report (Phase 2) following validation (Phase 3).

The quantitative and qualitative findings are merged to derive the answers to the research question.

1.7 Structure of the Thesis

This thesis is composed of eight chapters.

Chapter One is the introductory chapter and presents an overview of the problem, purpose of the study, research questions, research methodology and structure of the thesis.

In the following chapter, **Chapter Two**, the focus is on an overview of Saudi Arabia and the Gulf States countries, their location, population, area, culture and social life, and economy. It also describes the history of higher education in Saudi Arabia and the Gulf States countries. The last section in this chapter reviews available data about the development of Information and Communication Technology (ICT) in governments

and universities in Saudi Arabia and Gulf States countries. The chapter is included to provide background information for the reader who does not know much about Saudi Arabia and the Gulf States.

Chapter Three presents the relevant literature review related to the key concepts framing this dissertation. It reviews the literature relating to the information and communication technology in the university sector, its applications, benefits, requirements, and challenges. It also reviews the related literature on ICT in the Saudi Arabian universities and Gulf States.

Chapter Four presents Phase 1 of this research, which is the questionnaires methods, results and discussions. In particular, it discusses the methodological choices and describes the data collection and analysis techniques. Also, it outlines the statistical analysis and procedures including descriptive statistics, frequencies, percentages and correlations. Finally, the chapter discusses the findings.

Chapter Five presents Phase 2, which is the proposed solutions to the barriers existing in regard to ICT usage in Saudi universities. The chapter provides the methods that were employed to prepare this section and discusses the interim strategic report on problems and solutions, which includes a summary of the main barriers identified in Phase 1, consideration of the most important stakeholders who may help to overcome these barriers, and the proposed solutions for Saudi universities.

Chapter Six presents Phase 3 of this research, which is the validation of the strategic report by interviewing professionals and experts in Saudi Arabian universities. The chapter provides the methodological choices, describes the data collection and analysis techniques, discusses the interview data analysis and procedures, and concludes with a discussion of the interview data.

Chapter Seven presents Phase 4 of this research and it is the last stage. The chapter covers the final version of the solution strategies report, which was rewritten according to the feedback given by interviewees following the validation phase. In particular, it discusses the sections that were changed in the final report and explains how those changes incorporate feedback from the interviewees.

Chapter Eight concludes the thesis. A brief summary of the thesis phases is provided based on the research questions. Also, some recommendations are suggested for what

the universities should do. The chapter ends with a discussion of the study limitations and future research directions.

1.8 Summary

This chapter introduces the thesis topic, presenting the research background and overview of the current situation in Saudi Arabian universities. This research investigated the impact of these and other factors, with a view to proposing how Saudi Arabian universities can best position themselves so that they can realise the potential of ICT. The important deliverable is a report that identifies the barriers, stakeholders and strategic solutions to effective ICT use in the country's university sector. Also, in this chapter the research questions and their interrelationships were discussed. The chapter briefly described the research procedure and methodology, after which the structure of the thesis was presented.

This thesis incorporates material from three papers by the author. Chapter 4 uses material from the publications titled 'A Comparison of ICT Infrastructure in Saudi Arabian and Gulf Sates Universities' and 'E-mail use by the faculty members, students and staff of Saudi Arabian and Gulf states Universities', co-authored with Paul R. Calder and Brett Wilkinson. Finally, Chapter 6 is based on the paper titled 'Effective Use of ICT in Saudi Universities: Problems and solution strategies', co-authored with Paul R. Calder. Some material from each of these papers has also been incorporated into this introductory chapter.

CHAPTER 2 STUDY CONTEXT

2.1 Introduction

This chapter is included to provide background information to help readers unfamiliar with Saudi Arabia and the Gulf Stages understand the research context for the study. The chapter also includes a brief background about the current state of ICT in Saudi and Gulf States universities.

Like other parts of the world, the Gulf Cooperation Council (GCC) countries - United Arab Emirates (UAE), Saudi Arabia, Kuwait, Bahrain, Oman, and Qatar - are aiming to transform their higher education intuitions' ICT capacity (Al Musawi, 2012). Some Arabian Gulf countries began doing this a decade ago so that their government and education institutions were ready to go online at the appropriate time (Omari, 2013). This chapter presents an overview of education in Saudi Arabia and the Gulf States, beginning with a profile of these countries, their environment, people, and culture. The rapid growth in education over the last half-century is explained, as is the evolution of higher education from a pedagogy focused on rote learning to one where the students use digital and online technology to learn more about the world (Abu-Al-Aish, 2014). This process means adopting new media, and the concept of blended learning has emerged as a method for fulfilling rising demand for higher education opportunities (Almalki, 2011). This was very evident in the universities of Saudi Arabia and the Gulf States where this study has been conducted. Since Information and Communication Technology (ICT) is the major focus of this study, its development is described here in detail.

2.2 A Brief Background of the Countries in the Study

In this section a profile of the study countries is presented. The profile will focus on the recent introduction of ICT to Saudi Arabia and the Gulf States' cultural and social life, with reference to economy and geography. It is important that the reader understands the context in which higher education events occur.

2.2.1 Saudi Arabia

Saudi Arabia was fully united in 1932 by King Abd al-Aziz (Vassiliev, 2000). It is located in south western Asia in a strategic location between Asia, Africa and Europe

(Algahtani, 2011). In 2016, the population of Saudi Arabia was approximately 31.7 million of which the Saudis constituted 20.6 million (GASTAT, 2016). The country covers an area of 2,240,000 km² and it is divided administratively into 13 provinces: Makkah, Medina, Riyadh, Albaha, Jazan, Asir, Najran, Eastern, Qassim, Northern Border, Hail, Tabuk and Aljouf. A major problem exists in that despite the centralised administration these provinces are not developing at the same rate (Almalki, 2011).

Saudi Arabia is a deeply conservative Muslim country and it has a special and important value in the Islamic world because it is the site of two holy mosques. The Arabic language is the official language of the country except in some sectors of the economy such as healthcare and business, and some universities, where English is employed as a second language because of the large number of foreign workers (Algahtani, 2011). While Saudi Arabia has one religion, it has different schools of thought within Islamic jurisprudence which is called “madhhab”, while the government follows “Hanbali”. This indirectly or directly affects the culture and social life of the country. For example, women must wear the hijab in public, and education of both genders is segregated. This has many implications for the development of the provinces and their social and cultural life (Almalki, 2011).

Saudi Arabia’s economy is one of the strongest in the Middle East due to its oil reserves and centralised government control. During the 2013 fiscal year Saudi Arabia spent US$219 billion which represented an almost 20% increase on the 2012 budget expenditure. Budgeted capital spending in 2013 is 28% higher than it was in 2012. Education and healthcare remain the focus of spending, and these account for 37% of the total budget (MEP, 2015). 90% of Saudi Arabia budget dependent on the oil revenues which is anxiety because oil prices ($50/barrel) are less than half the level the Saudi government needs. Because of that, Saudi government has launched Vision 2030 which aims to expand the non-oil sector of the economy and plan designed to create a 21st century Saudi economy virtually (Salameh, 2016).

2.2.2 Gulf States

The five countries covered in this section - Kuwait, Bahrain, Qatar, the United Arab Emirates (UAE), and Oman - are all Gulf States and they share certain characteristics. They are all part of the Cooperation Council for the Arab States of the Gulf which was

established in 1981. Part membership has been extended to Yemen and Iraq (Robinson-Pant, 2014).

Qatar is the second smallest territory of the Gulf States. Its population in 2014 was about 2.1 million with most people aged between 25-54 years. Its geographical area is about 11,586 km² and it borders the Gulf and Saudi Arabia (CIA, 2015). Approximately 20% of the population are Qatari nationals; the rest comprise expatriate workers and their families (Moini et al., 2009).

Oman is second biggest country in the Gulf covering an area of 309,500 km² and it borders the Arabian Sea, Gulf of Oman, Arabian Gulf, Yemen, UAE and Saudi Arabia. In 2014, Oman's population was about 3,219 million of which 30% were aged between 0-14 years (CIA, 2015).

Bahrain is the smallest country in the Gulf States covering an area of 760 km². It is situated on an archipelago in the Arab Gulf, east of Saudi Arabia. Its population in 2014 was about 1.3 million and this constitutes the smallest population in the region (CIA, 2015).

Kuwait along with the UAE were the first countries to suggest the establishment of Gulf Cooperation Council (GCC) for the Arab States in 1981. It shares a border with Iraq, Saudi Arabia and the Arab Gulf and it covers an area of approximately 462 km². In 2014 its population was approximately 2,742,711 (CIA, 2015).

United Arab Emirates is the most famous country in the Gulf States because it is where Dubai is located, and it is very free and modern compared to the other Arab countries. UAE borders the Gulf of Oman and the Arab Gulf, Oman and Saudi Arabia and its geographical area is about 83,600 km². It has the second biggest population (5,628,805) after Saudi Arabia and it is a major destination for trade and tourism (CIA, 2015).

The union came about because all the Gulf States countries share the same characteristics and have similar cultures in terms of language, religion and lifestyle. The official language in all the Gulf States' governments is Arabic but English is commonly used as a second language (Torstrick & Faier, 2009). Other languages do exist but are more limited in their use such as Farsi in Kuwait, Qatar, Bahrain, UAE,

Urdu in UAE, Oman, Bahrain, Baluchi in Oman, and Indian dialects are spoken in Oman, Bahrain and UAE (CIA, 2015).

Islam is the main and official religion in the Gulf States and only a very small number of people follow other faiths such as Christianity. In terms of Islamic sectarian belief, most Muslims in the Gulf States except Oman are Sunni and a small number are Shia while in Oman the majority are Ibadhi. Religion is at the heart of life in the Gulf States and it dominates their cultures and lifestyles. Strictness of faith differs from country to country but compared to other Islamic countries the Gulf States are generally very conservative (Torstrick & Faier, 2009).

Most of the Gulf States' economies are based on profits and revenues from oil and therefore the quality of life is typically high. Bahrain has heavily invested in banking and tourism (Hudson & Kirk, 2014). This particular country's capital, Manama, is home to many large financial institutions and it has a high Human Development Index and was recognised by the World Bank as a high income economy. The UAE has been successfully diversifying its economy so that its GDP is impressive (Ewers, 2015). Qatar's economy has been diversifying like that of UAE. To pursue a strategy of tourism-led growth, it requires an image that attracts visitors, because a positive image is an intangible asset that is much harder to build than infrastructure (Morakabati, Beavis, & Fletcher, 2014).

2.3 Higher Education History

2.3.1 Saudi Arabia

Higher education was established in Saudi Arabia in several phases. In the 1950s King Saud University (KSU) began operating, which was quite late compared to other countries. Higher education remained under the control of the Ministry of Education until 1975 when it was divided into the Ministry of Higher Education and Ministry of Education (Alamri, 2011). In 2015, the Saudi Arabian government merged these two ministries into one and called it the Ministry of Education in an attempt to streamline the development of education (Faiz & Al-Mutairi, 2015). Education is free for every student and the government gives higher education students a monthly stipend. Graduates receive some privileges and this has led to more students in recent decades. Originally there were no females on university campus and the first women-only school in Saudi Arabia only began in 1960. Cultural attitudes pertaining to women's

place in Islamic society have ensured that men outnumber women in higher education (Alamri, 2011). Over the years, this idea has gradually lost traction and now Saudi Arabia has established universities and several colleges for women. Nowadays, more women than men graduate with a university or PhD degree in Saudi Arabia (Jamjoom & Kelly, 2013). Prior to the turn of the century, Saudi Arabian higher education had only 7 universities (Alamri, 2011). Table 2-1 summarises the Saudi universities.

Table 2-1 Details of old Saudi universities (Alamri, 2011).

University Name	Established	Provinces
King Saud University (KSU)	1957	Riyadh
Islamic University of Madinah (IUM)	1961	Medina
King Fahd University for Petroleum and Minerals (KFUPM)	1963	Eastern
King Abdul-Aziz University (KAU)	1967	Makkah
Imam Muhammad Bin Saud Islamic University (IMSIU)	1974	Riyadh
King Faisal University (KFU)	1975	Eastern
Umm Al-Qura University (UQU)	1981	Makkah

All universities in Saudi Arabia established several campuses throughout the provinces. For example KSU has campuses in different provinces such as Qassim, Asir and Jazan. In 2002, a royal edict decreed that new universities should be created throughout the country (Smith & Abouammoh, 2013).

Many Saudi students lack the opportunity to go to university because there are simply not enough places for them. If a person wants to complete his or her studies, he/she may have to enrol in a foreign university because no private universities were operating in Saudi Arabia. Also, many students cannot go to a local university because they are too far away. Saudi Arabia is very big country and sometimes students must travel over 2000 km just to get to their destination (Krieger, 2007). The total university student enrolment in Saudi Arabia in 2005 was 151,998 and this rose to 379,179 in 2013. This represents an increase of about 249% in nine years (CDSI, 2014). In 2011 there were 107,706 Saudi students studying in universities in other countries and 80% of these were supported by the government (Smith & Abouammoh, 2013).

At the dawn of the 21st century, Saudi Arabia's higher education began expanding in the public and private sectors. The Ministry of Higher Education began opening public universities and colleges and permission for private universities or colleges to start operating. This led to more than 100 new universities and colleges being funded with a $15 billion budget where the objective was to ensure equal distribution of funds in all the provinces. In 1999, the Saudi Arabian government gave permission for eleven

private colleges to start operating which marked the beginning of this expansion (ME, 2015). Table 2-2 lists all the government universities that have been operating since 1999 and the provinces in which they are located.

Table 2-2 Details of new Saudi universities since 1999 (ME, 2015)

University Name	Established	Provinces
King Khalid University (KKU)	1999	Asir
Taibah University (TU)	2003	Medina
Taif University (TU)	2003	Makkah
Qassim University (QU)	2004	Qassim
King Saud bin Abdulaziz University for Health Sciences	2005	Riyadh
University of Hail (UOH)	2005	Hail
Aljouf University	2005	Aljouf
University of Tabuk (UT)	2006	Tabuk
Albaha University (BU)	2006	Albaha
Najran University (NU)	2006	Najran
Jazan University (JU)	2006	Jazan
Princess Nourah bint Abdulrahman University (PNU)	2007	Riyadh
Northern Border University (NBU)	2007	Northern Border
Prince Sattam bin Abdulaziz University (SAU)	2009	Riyadh
Majmaah University (MU)	2009	Riyadh
Shaqra University (SU)	2009	Riyadh
University of Dammam (UOD)	2009	Eastern
Saudi Electronic University (SEU)	2011	Riyadh
Bisha University (BU)	2014	Asir
Hafr Al-Baten University (HBU)	2014	Eastern
Jeddah University (JU)	2014	Makkah

Most new universities are joint campuses such as Qassim University, King Kalid University, Taif University and others. For example, Qassim University is a combination of King Saud University (Qassim campus) and Imam Muhammad ibn Saud Islamic University (Qassim campus) and its constituent colleges became a part of Qassim University (ME, 2015). On the other hand, some of these universities started are very old institutions and they require time to function like the newer universities. Specifically, they need more time to obtain suitable infrastructure whereas the newer joint universities already have good infrastructure in place (Samara et al., 2015).

There are higher education institutions that do not come under the Ministry of Education in Saudi Arabia and these include military and security colleges and technical and vocational training colleges (Algahtani, 2011). Private universities and colleges represent a new sector in Saudi Arabia and for many reasons there are some new challenges facing this sector. All levels of education in Saudi Arabia are free to its citizens (Alamri, 2011). The first private university opened in 2002 two years after the Minister issued a decree setting out regulations. The government tries to help private universities with developing their facilities. Although the number of private education institutions has grown strongly, more are still needed (Al-Dali et al., 2013).

Table 2-3 summarises the number of private universities in Saudi Arabia and their location.

Table 2-3 Details of private universities in Saudi Arabia (Al-Dali et al., 2013)

University Name	Established	Provinces
Arab Open University	2002	Riyadh
Prince Sultan University	2003	Riyadh
Al Yamamah University	2004	Riyadh
Dar Al Uloom University	2005	Riyadh
Prince Mohammad University	2006	Eastern
Alfaisal University	2007	Riyadh
Prince Fahd bin Sultan	2007	Tabouk
Sulaiman Al Rajhi University	2009	Qassim
Effat University	2009	Makkah
King Abdullah University of Sciences and Technology	2009	Makkah
University of Business and Technology	2012	Makkah

Higher education in Saudi Arabia has experienced tremendous growth over the last five decades. The number of public and private universities is 38 with a total enrolment of 1.3 million students, with female students now representing 55%. Moreover, new universities will be established in different regions of Saudi Arabia according to a royal decree issued recently. Universities and colleges offer graduate studies programs which grant Master and Doctoral degrees in some areas. As with other aspects of the education system in Saudi Arabia, higher education is designed and evaluated with reference to the national development plan, and is considered vital for fulfilling the potential of the Kingdom's greatest resource - its people (IECHE, 2015). The Saudi Arabian government will spend about US $51.1 billion on education and training in 2016 (MF, 2016). Furthermore the government will offer international scholarships to 207,000 students (MF, 2015).

2.3.2 Gulf States

Qatar: higher education is not free for students. Qatar University is the first university which was established in 1973 and consists of one college (Powell, 2012). Nowadays, most students are female and this equates to three-quarters of the total student population (Moini et al., 2009). In 1995, Qatar Foundation partnered with six United States universities to create the Qatar Foundation and Education City (Spangler & Tyler, 2011), which hosts diverse education and research organisations (Powell, 2012).

Oman: Higher education in 1986 was established through the Sultan Qaboos University, which was the first government university. In 1994, higher education formalised and regulated private higher education to serve the country's growing

population (Donn & Issan, 2007). Currently Oman has seven private universities and one government university (NCSI, 2016).

Bahrain: Until 1968 students had to travel abroad to get a tertiary education because there was no local institution (Karolak, 2012). Many colleges were then established and the General Convention of Arab Education for the GCC at its fourth meeting in Bahrain (1979) established the Arabian Gulf University, which was to be located in the Bahrain (AGU, 2010). In 1984 the government opened the University of Bahrain. One solution to the rising demand for higher education in the early 2000s was to encourage the establishment of private universities (Karolak, 2012). A boom in private higher education eventuated and 12 private institutions have been established in the last decade (MOEDU, 2012). In contrast there is only one public sector institution. This is linked to the transition to a more market-oriented economy and to changing population needs. Because Bahrain is very close to Saudi Arabia, many students especially from the eastern provinces prefer to study there because there are more higher education institutions. Some recently founded institutions were created by local capital investment, while others involved foreign investors (Karolak, 2012).

Kuwait: Kuwait University opened in 1966 and was the first and is still the only government university (Findlow, 2013). It has five campuses and consists of 16 colleges (KU, 2015). Kuwait has 4 private universities and 6 colleges (KGO, 2015) which are controlled by the Private Universities Council chaired by the Minister of Higher Education (PUC, 2015).

United Arab Emirates: Citizens can attend government institutions free of charge (EUAE, 2015). In 1976, the United Arab Emirates University in Al Ain was founded and it served as the flagship of higher education in the United Arab Emirates. This university serves the whole country in different campus locations (Fox & Al Shamisi, 2014). After that, many higher colleges were established such as higher colleges of technology. In 1998 Zayed University was founded in Abu Dhabi and Dubai (Findlow, 2013). The UAE has been keen to form partnerships and joint ventures with international education institutions, attracting some of the most prestigious education providers from around the world (Fox & Al Shamisi, 2014). In 1999, the Ministry of Higher Education and Scientific Research (MOHESR) founded the Commission for

Academic Accreditation (CAA), which provides institutional licensure and degree accreditation for private universities and their academic programs (MOHESR, 2015).

2.4 Development of ICT in Government

The Arab Spring uprisings that erupted a few years ago to some extent led to political upheavals in Tunisia, Egypt, Libya and Yemen, yet the economy of the Gulf States has remained stable. This secure environment has improved Gulf States governance, infrastructure, technology and society and these improvements represent encouraging milestones in the change to a knowledge-based economy (Abu Nadi, 2012). Information and Communication Technology (ICT) now plays a significant role in these countries' economies (AlGhamdi, 2012).

2.4.1 Saudi Arabia

In the early years of the 21st century Saudi Arabia made attempts to build a strong ICT infrastructure. Over the last decade, the Saudi government has made the country the largest and fastest growing ICT marketplace in the Arab region. ICT services spending reached SR 111 ($ 29.5) billion in 2014 (CITC, 2014). Recently, the Saudi government has concentrated on privatising the Information and Communication Technology (ICT) infrastructure by opening the telecommunication sectors to the corporate sector (AlGhamdi, 2012).

The communications network in Saudi Arabia was extended throughout the country. In 1995, mobile services started operating (Almalki, 2011). In 1994, Saudi Arabia introduced the Internet, although in 1997 Saudi Arabia was still the slowest country in the region to allow public and regular access to it (Alkhalaf, 2013). In 1998, the government-owned Saudi Telecom Company (STC) was in charge of the country's telecommunications services. ICT demand and supply accelerated while that of landline services declined because it remains expensive; mobile services in contrast boomed (Almalki, 2011). The Internet only became available widely in the larger cities to the public in 1999 but once online access was made officially available in the country, Saudi Arabia witnessed a larger and more rapid increase in Internet user population than any other Arab nation (Alkhalaf, 2013). The Saudi Communication and Information Technology Commission (CITC) confirmed that the Internet has become an integral part of Saudi society (AlGhamdi, 2012). However, due to cultural

and traditional values that are being maintained in Saudi society, the Internet is censored throughout the country (Almalki, 2011).

The Communication and Information Technology Commission CITC was created by the Saudi government in 2001 to take over the main role of ICT regulation in the country to provide the regulatory framework of the ICT sector in Saudi Arabia (CITC, 2015). Following this an independent ministry called the Ministry of Communications and Information Technology (MCIT) was created in 2003 by the government to supervise communications and information technology activities in and ensure vital services were distributed effectively throughout the country (MCIT, 2015).

In 2003 the Saudi government decided to implement e-government but the actual committee work began in 2005 with the cooperation of three government entities: The Ministry of Communication and Information Technology (MCIT), the Ministry of Finance and the Communication and Information Technology Committee (CITC). In 2005, 'Yasser' - which is the name of this e-government program - was launched and serves as an umbrella for all e-government activities, procedures, legislation and relevant issues (Abu Nadi, 2012). In 2007, as part of the Saudi government's long-term economic development plan, a National Communications and Information Technology Plan came into being (Almalki, 2011). According to this e-government plan, by the end of 2010, everyone in Saudi Arabia was expected to enjoy online services from anywhere and anytime, but this has not happened. As a result of this delay, a second e-government action plan has been launched (AlGhamdi, 2012). The many developments in Saudi Arabia's ICT have included the Saudi Stock Exchange (Tadawul) in 2003 which facilitated trading of Saudi stocks, local and foreign exchange (Abu Nadi, 2012).

The Ministry of Hajj and other tour operators are responsible for organising pilgrims' needs and this has led to more visa and accommodation reservation activities. Saudi Arabia's e-government readiness position has improved by 15 positions in the ranking since 2003 despite the current absence of a national portal or website. Many ministries have established an online presence providing informative websites such as Ministry of Health (www.moh.gov.sa.), Ministry of Labor (www.mol.gov.sa), and Ministry of Education (www.moe.gov.sa) (AlShihi, 2006). These improvements represented only the initial phases of the country's e-government programme. The United Nations

Department of Economic and Social Affairs (UNDESA) e-government survey in 2016 ranked Saudi Arabia 44th out of 190 countries that comprise the e-government development index, compared with 36th in 2014. This means that productivity and efficiency are not improving in the public sector in Saudi Arabia. Also, the report states that the usage of e-government in Saudi Arabia and globally is generally low (UNDESA, 2014, 2016).

The Saudi government realises the importance of e-government, and has begun to learn from the experiences of other countries. Now that it is a World Trade Organization member, Saudi Arabia has to fulfil certain conditions, one of which concerns e-government (Omari, 2013). In the UN E-Government Readiness Report 2012, Saudi Arabia ranked 58 in 2010 (Alshehri, 2012). From that point Saudi Arabia started to enhance different Saudi ministries' services in the last few years.

2.4.2 Gulf States

Qatar launched its first online services in July 2000 which allowed residents to renew their permits. In 2003 the Qatar government developed an e-government portal with a few online services. Now it is possible to report and replace lost and damaged driving licenses, individuals and businesses can check online for traffic violations and lodge payments securely online, and select and pay for Zakat and different kinds of donations and others. E-employment services were launched in January 2004 and this permits people to submit their resumés and browse job vacancies and employers' websites (AlShihi, 2006).

In 2008 the Qatar government launched a new e-government portal called 'Hukoomi'. This user-friendly portal allows people in Qatar to easily access government information and services any time, and is part of a long-term modernisation effort. It is a major initiative of ictQATAR's i-Gov program, which was launched in early 2007 (ictQatar, 2015). In 2010, Hukoomi 2 was launched with enhancements including more information and more agency services, and new features such as event coverage, news, and directories. Following received feedback, Hukoomi was redesigned based on users' recommendations and suggestions and has undergone a major upgrade in the informational architecture interface. In late 2014, the new Hukoomi mobile app was launched and will further improve transparency and level of access to government entities (Hukoomi, 2015).

Oman was the lowest-ranked GCC country in terms of e-government development in 2016 and was 66th (UNDESA, 2016). In November 2002 the Oman Council of Ministers approved the National IT Strategy known as the Digital Oman Strategy. In 2003, the e-government initiative in Oman was originally launched and was later shortened to e-Oman (Al-Mamari et al., 2014). Currently, Oman is implementing a holistic approach to its e-Oman strategy, consisting of e-government, e-commerce, e-learning and other e-services (Omari, 2013). The year 2006 saw the establishment of the Information Technology Authority (ITA) by royal decree. The authority is responsible for implementing national ICT infrastructure projects and supervising all works linked to the Digital Oman Strategy. It also offers professional leadership to other e-governance initiatives (Al-Mamari et al., 2013).

Bahrain had its population register database established in 1984 and it contains data on people, land and establishments. A government data network was developed in 1996 and now connects all ministries in Bahrain and services that share resource applications. In February 2001 the Bahrain government introduced e-voting for people to express their views and opinions on certain issues (AlShihi, 2006). Of all the Gulf Cooperation Council (GCC) countries, Bahrain ranks 24th in e-government worldwide and is the leading GCC country in this area. Bahrain established a Supreme Committee for Information and Communication Technology (SCICT) and the e-Government Authority was created to develop and implement a comprehensive e-government strategy. The country held the Bahrain International e-Government Forum in Manama in April 2013, dealing with innovation and open data, mobile trends, cloud computing and shared services, social networks and e-government (UNDESA, 2014).

Kuwait has improved in the global rankings in e-government and is now in 40th place (UNDESA, 2016). The Kuwait government collaborated with a local private company specialising in software solutions (FAPCO) to develop a Kuwait portable which included various types of information, including the e-government project serving as a gateway to all government eservices. Kuwait signed a Memorandum of Understanding with Singapore to help with the assessment and development of its e-government plans, requirements and collaborative strategies (AlShihi, 2006). While the Kuwaiti government had much success in e-government through different projects and activities, it needs to review its e-government strategies and services to catch up with e-government developments in the other Gulf States countries (Omari, 2013).

United Arab Emirates, especially the Emirate of Dubai, stands as the leader in e-government. It provides a wide variety of online governmental services. It is clear that the UAE e-government initiative is one of the most citizen-centric regional strategies serving as an example not just for the GCC countries but also globally. In a short period of time, Emirates e-government has succeeded in leading the UAE in the field of e-readiness and worldwide (Omari, 2013). The UAE government was able to deliver more than 600 online services in Dubai to people and businesses in three years since 2001. For example the crown prince of Dubai website facilitated communication with his people, online tourist visa applications, e-currency system and others (AlShihi, 2006).

Table 2-4 E-government development of Gulf Cooperation Council (GCC) (UNDESA, 2016)

Country	EGDI 2016	2016 Ranking	2014 Ranking
Bahrain	0.7734	24	18
United Arab Emirates	0.7515	29	32
Kuwait	0.7080	40	49
Saudi Arabia	0.6822	44	36
Qatar	0.6699	48	44
Oman	0.5962	66	48
World Average	0.4922		

2.5 Development of ICT in Universities

2.5.1 Saudi Arabia

When higher education began in Saudi Arabia, it was very difficult to find the appropriate professional people and leaders to run it. At that time the infrastructure in Saudi Arabia was not well developed, leading to delays in higher education's development. Higher education began improving but was not as good as that in neighbouring countries, however, the arrival of the Internet changed all this. Nonetheless delays in implementing Internet services still caused tertiary education in Saudi Arabia to improve only slowly. In the education sector, ICT was accepted and there was an expectation that instructors, teachers, lecturers, etc., would incorporate ICT functions into their curricula, and use its communications and interactive features to overcome problems concerning resources, gender, and physical access restrictions. ICT, however, are not universally implemented in Saudi universities (Almalki, 2011).

In 1978 King Fahad University established a Department of Computer Science and Computer Engineering. Students were awarded a bachelor's degree and this was

followed in 1983 by a Master's program in Computer Science. King Abdul-Aziz University (KAU) was one of the first universities to use computer technology in its library and admissions department. It was also the first university in Saudi Arabia to develop and implement computer technology in office/administrative work, such as admissions, registrations, course schedules and grade reports in the Arabic language. In 1976 the university computer centre began operating and provided various services, for example computer hardware, software, and maintenance of colleges and the other branches (Al-Oteawi, 2002).

In 1993, King Fahd University of Petroleum & Minerals (KFUPM) in Dhahran was the first institution to install the Internet through the College of Computer Sciences and Engineering. Yet the growth in Internet users did not automatically lead to a better learning and teaching system. A computer course in some Saudi universities such as King Fahad University and King Saud University was mandatory as a graduation requirement (Almuqayteeb, 2009). In 2003, the e-Learning Centre, in the Deanship of Academic Development at KFUPM offered integrated access to online resources using WebCT. Then in 2005 the Deanship of Distance Learning at KAU was established. In 2006, KKU established its Deanship for e-Learning and Distance Learning (DL), with a focus on doing all courses online by 2012. KSU established the Deanship for e-Learning and Distance Learning in 2007, while the e-Learning Unit at King Faisal University got underway in 2008 (Al-Asmari & Rabb Khan, 2014).

Research indicates that Internet adoption rates in higher education are increasing (Almalki, 2011). The Internet has enormous implications for ICT in Saudi Arabia and its universities started to use ICT, especially in the task of developing e-learning (Alkhalaf, 2013). In 1996, the Ministry of Higher Education (MOHE) established the Computer and Information Centre (CIC) to provide a range of ICT services to schools and educational centres. In 2000, MOHE launched an ambitious computer project aiming to incorporate all schools in Saudi Arabia (Al-Asmari & Rabb Khan, 2014).

In 2008 the Saudi Arabian Ministry of Higher Education established a National Centre of E-learning & Distance Learning (NCeDL) to promote and facilitate the spread of e-learning systems in Saudi universities. It did so to solve problems such as the large geographical, cultural and religious reasons for segregation according to gender and other issues. A few benefits in using ICT in higher education emerged (Alkhalaf et al.,

2010). Almalki (2011) pointed out that e-learning or blended learning programs are not implemented in all Saudi universities. Currently, many Saudi universities have formal agreements with the NCeDL to introduce e-learning schemes into their curricula (Al-Asmari & Rabb Khan, 2014). This begs the question of why universities in Saudi Arabia did not immediately benefit from ICT as other universities around the world did. In Saudi Arabia there are many differences between universities in terms of infrastructure because most are new institutions. Some old universities are located in old buildings and therefore lack good infrastructure. Some ICT tools can nevertheless improve learning and teaching methods and make systems and procedures more efficient for both students and teachers (Natalicio, 2000).

Universities like other government organisations in Saudi Arabia face problems and challenges in providing ICT. Some of these challenges also occur in other developing countries. Those that are specific to Saudi Arabia originate from the fact that compared to other Arab countries it had not been the colony of an imperial power. Until 1932 the country consisted of sheikdoms until they were united under a national monarchy. Since then Saudi Arabia has developed the biggest ICT market in the Gulf region, with a forecasted value of US$3.8 billion in 2011 expected to rise to US$5.7 billion by 2016. Saudi computer hardware sales including PCs, notebooks and accessories were expected to reach more than US$1.9 billion in 2011. PC penetration is currently about 24% and should increase to more than 30% by 2015. In contrast to other countries in the region, such as the UAE, which has recently experienced an exodus of expatriate workers, Saudi Arabia's growing population will be a positive market driver (BMI, 2015).

The extent and effectiveness of ICT deployment and use in Saudi Arabia’s university sector is well behind that in comparable institutions in countries such as the US, European nations, and Australia. This situation is caused by several factors, including problems with infrastructure at both university and national levels, cultural expectations of staff and students, and community attitudes which tend to be conservative. While Saudi Arabia is a wealthy country due to its natural resources, Internet access has only become widely available in recent years. Furthermore the strict application of Islamic law has led to its education system being segregated according to gender, and this has far-reaching and important implications for the

education sector. Essentially it puts it at odds with the open-access culture practiced in many other countries.

Saudi Arabia's government understands the importance of technology and science and consequently it is trying to improve how they are used. For example Saudi Arabia's King Abdullah University of Science and Technology (KAUST) received a US $10 billion grant, making it the world's sixth-richest university with international staff and students leading to a more culturally cosmopolitan campus life (Krieger, 2007). Also, one of the biggest supports to improve ICT in universities is the Saudi Electronic University which was established in 2011. The goal of this university is to boost distance education in Saudi Arabia, offering advanced courses to students (Hilmi, Pawanchik, & Mustapha, 2012).

2.5.2 Gulf States

Qatar's Supreme Council of ICT (ictQATAR), the National ICT Plan and Qatar Foundation have influenced use of ICT in higher education (Al Musawi, 2012). Qatar universities have also established a well-known ICT infrastructure and authorities that cater for e-learning and mobile learning initiatives (Al-Shehri, 2014). American universities located in Education City provide full-fledged degree programs in business, computer science, engineering and others. The students experience the same admission standards, grading systems, textbooks, and even lectures from the same professors as their American counterparts (Joseph & Lunt, 2006).

Oman's higher education ministry has put a particular emphasis on improving the learning methods by developing and implementing a unified e-learning management system (Moodle). The intention here is to improve people's e-learning skills supported by a Learning Resource Centre (LRC) that provides ICT services for students and staff members (Al Musawi, 2012).

Bahrain University in 2004 began cooperating with a telecommunication company that established an e-learning Centre to disseminate e-culture among its faculty members and gradually transfer the academic programs and curricula to e-programs (Al Musawi, 2012).

Kuwait's higher education institutions have adopted the distance learning approach. For example the University of Kuwait links its three campuses to the distance learning centre's facilities (Al Musawi, 2012).

United Arab Emirates' federal higher education signed a contract in 2010 with board Inc. to provide innovative learning (Al-Shehri, 2014). The United Arab Emirates University (UAEU) developed its ICT curricula based on the work done by ICT experts. These included deans from several major US universities. Most of the country's universities have included a preparatory year for equipping their students with adequate communication and mathematical skills (Joseph & Lunt, 2006).

2.6 Summary

This chapter provides an overview of Saudi Arabia and Gulf States which are Qatar, Oman, Bahrain, Kuwait and United Arab Emirates. This review includes background information on Saudi Arabia and Gulf States location, population and area, culture and social life, and economy. This chapter also presents an overview of the higher education history in Saudi Arabia and the Gulf States. The chapter concludes with an overview of the developments of ICT in Saudi Arabia and the Gulf States which includes ICT in governments and universities.

CHAPTER 3 LITERATURE REVIEW

3.1 Introduction

This chapter provides an overview of the literature related to the current study. The literature review addresses the concept of information and communication technology (ICT), use of ICT in education and universities, and its importance in the sector.

The focus of the review is on the barriers facing the e-government and education system in developing countries, especially Arab countries and Saudi Arabia specifically. The review considers studies that were conducted in various places involving the ICT sector, and highlights the most important results and outcomes that are relevant to this thesis. The first section examines studies on ICT in Saudi Arabia and in particular Saudi Arabia's education system. Studies about ICT in the education system of other developing countries are then assessed. Finally, the broader use of ICT in developed countries is discussed.

The chapter concludes with a discussion of studies that have proposed solutions that may help to overcome these issues.

3.2 ICT in the Education System

Information Communications Technology (ICT) is defined as a diverse set of technological tools and resources used to communicate, and to create, disseminate, store, and manage information (Tinio, 2003). Educators use a variety of terms to describe work or information that is communicated electronically, including media, multimedia, technology, information technology, computing, etc. The term that is applied with refers to computer hardware, computer software, input and output devices, visual display devices, communication networks, and communication hardware and software (Al-Alwani, 2005). It combines two areas: firstly, information and communication technology strategy which consists of technology governance, distinctive competencies and technology scope; and secondly, information and communication technology infrastructure which consists of ICT architecture (hardware, software, data, applications, and communication platforms), development of specific ICT practices (application development, systems management, and maintenance functions), and ICT skills. These skills incorporate experience,

competence and the values of employees who use technology in their day-to-day work (Lach-Smith, 2010).

Introducing ICT into an education system clearly changes the way education is conducted. ICT plays a significant role in developing human capital through bringing about revolutionary change in a country's education system. Most schools, colleges or institutions of higher education use ICT (hardware, software and networking) for the purpose of data storage, processing and reporting for teaching, learning and administration (Devi et al., 2014). Today, ICT is a very important facet in every field of daily life. Within the field of education, the right application of ICT may lead to the accomplishment of many educational goals more efficiently and in quicker time by enabling qualitative improvements in teaching and learning (Al-Alwani, 2005; John, 2015).

Due to rapid advances in information technology, computers and computer-related technology have become an essential part of teaching and learning. Technology has the potential to enhance teaching and learning beyond what traditional methods allow by giving teachers more knowledge and alternatives to guide the process of learning, and giving students more control over their learning (Ouzts & Palombo, 2004). Several scholars have identified different reasons why technology should be used in education. The use of technology in a country's education system can facilitate learning by providing more relevant learning opportunities, changing the orientation of the classroom from teacher- to student-centred, preparing students for employment, increasing flexibility of education delivery, increasing access, and potentially satisfying demands for better learning or teaching efficiency.

ICT also helps to improve access to education and training, to improve the quality of learning experiences, to reduce the cost of education, and to improve the cost-effectiveness of education (Algahtani, 2011;Alkhalaf, 2013; Devi et al., 2014; John, 2015). Therefore, the impact of technology on teaching and learning should be a major concern for all educators (Roberts, Kelley, & Medlin, 2007). The following sections will focus on the use of ICT in the higher education system and its importance.

3.2.1 ICT in Higher Education

Many terms are used to describe ICT in the university field to create a 'smart' campus, for example e-learning, e-government, blended learning, distance learning and others.

All of these terms come under the umbrella of the term ICT (Tinio, 2003). In the university scenario, there are different stakeholders and departments, faculties, etc., using ICT (Meyers, 2006). For developing countries ICTs have the potential to increase access to and improve the relevance and quality of education (John, 2015). ICT is a potentially powerful tool for extending educational opportunities, both formal and non-formal, to previously underserved constituencies such as scattered and rural populations, groups traditionally excluded from education due to cultural or social reasons such as ethnic minorities, girls and women, persons with disabilities, and the elderly, as well as all others. This discrepancy has occurred due to reasons of cost or time constraints or simply because they are unable to enrol on campus (Mathew, 2011).

3.2.1.1 The Importance of ICT in University

This section highlights the importance of ICT in universities and its central role during a transformational period in higher education (Koester, 2011). There are several advantages in using ICT in universities and these are apparent in Saudi Arabia. ICT enables teachers and students to be more connected in the classroom because ICT provides teachers with a wide choice of multimedia, software, applications and devices with which to create more exciting, interactive lessons and subjects. ICT provides the ability to carry out distance learning (DL) (Bingimlas, 2009) and it is leading to improvements in library delivery systems and services to the public (Kelvin, Oghenetega, & Jackson, 2012). ICT helps students, teachers and researchers get the information they require faster than before (Chatterjee & Nath, 2015).

ICT can also benefit universities' economic structures by reducing expenses and increasing their incomes over the long term. Many universities have experienced rising numbers of students yet universities cannot increase their capacity if they do not receive adequate income from the right number of students. Moreover, in Saudi Arabian university education is free and the government is forcing universities to accept more students than they have room for. Yet many students all around the world want to study in a university in a different country because: firstly, what they want to do is not available in their country's universities; or secondly, the cost of a program in their country is higher than overseas (Algahtani, 2011).

Some students cannot attend university in a full-time capacity due to work or social reasons. Many of these problems can be solved by ICT in the form of e-learning or

distance learning (DL). ICT can offer virtual classrooms and increase university capacity faster than physical solutions such as providing more classrooms or laboratories (Marengo & Marengo, 2005). Moreover, ICT can facilitate many advantages for some students who have special needs, such as those with disabilities who find it difficult to physically attend university. E-learning can help this kind of student to complete their studies more easily and with less problems. Furthermore, e-learning can provide them with more knowledge which can support and prepare them for the workplace (Barrett, 2009).

ICT can also assist students to further their education and overcome any difficulties. In some countries, many students who live in a small city or village which does not have a higher education institution nearby lack the ability to complete their study, especially if the education system disadvantages females. Many families do not allow their daughters or other female kin to travel long distances or live away from their family for reasons of personal safety or cultural or religious expectations, such as those occurring in Saudi Arabia. Therefore, ICT offers e-learning which can help them to complete their studies without leaving home (Dhanarajan & Abeywardena, 2013).

ICT can help universities overcome certain barriers which have arisen due to the pressures of culture or religion such as segregation by gender. The only university in Saudi Arabia that teaches males and females on the same campus is the King Abdullah University of Science and Technology, and even then only in the college of medicine. Moreover, Saudi Arabia does not have enough locally-born staff especially in women school to teach in its universities. According to data from the 2014 report by the Ministry of Education (Table 3-1), 42.5% of faculty members in Saudi Arabia's universities were non-Saudi (OHE, 2014). To some extent, ICT can help overcome this problem by allowing men and women to access the same lecture remotely but in different places which may help to overcome the lack of faculty members problem especially in women school (Altowjry, 2005).

Table 3-1 Statistics on Saudi Arabian universities concerning faculty members according to their nationality in 2014 (OHE, 2014).

Gender	Faculty members		Total	%
	Male	Female		
Saudi	23364	19059	42423	57.5
Non- Saudi	20564	10830	31394	42.5
Total	42423	31394	73817	100

There are many advantages to using ICT in administration in the university sector. ICT helps to improve the consistency of administrators' quality of work by reducing errors and saving time. Many transactions in university which do not involve ICT face problems such as lost paperwork, delays in finishing orders, or overlooked tasks. Also, ICT helps to reduce overhead costs in administration such as mail and preparation of reports. Millions are spent on the cost of sending documents between faculties and campuses. ICT can reduce costs by reducing the number of staff to the essential level. Moreover, when staff want to access old data or documents, ICT facilitates much quicker access (Jung & Shin, 2015; Omari, 2013).

Finally, ICT can benefit universities' administration departments or units in a large country like Saudi Arabia. Some universities have several campuses and the distance between them and the main campus can be as high as 200 km. A university will therefore face many problems in facilitating and sharing resources unless ICT is used. Faculty members can provide lectures for their institution despite being somewhere else in a different region of the country or a different country altogether (Glenn & D'Agostino, 2008).

3.2.1.2 University Stakeholders

Generally, universities contain three categories of stakeholder: administrators, faculty members (including support staff) and students. All these categories overlap, so activities of one category will impact on anther as well as on the wider community.

Currently, technology is changing at a rapid pace and is undergoing many changes, and its impact on our daily lives can be felt. Virtually everyone is now a 'digital' person and the new generation of students interacts with technology so that it is an everyday reality or part of life. Instead of books in their bags, students often carry several computer devices such as a laptop, tablet, iPod, etc. Universities and faculty members use technology to attract students and forge a strong relationship with their university

(Trends in Higher Education Marketing, Recruitment, and Technology, 2014). Teachers have found that appropriate use of ICT makes their learning and teaching more efficient. According to the president of California State University, Northridge, a regional comprehensive university serving approximately 35,000 students in the metropolitan expanse of Los Angeles and Southern California, many teachers simply needed to ensure that information technology, like electricity and water, was reliably available and functional for faculty, staff, and students (Koester, 2011).

Students can benefit from ICT in terms of saving time and money. They can access the Internet at any place and at any time to obtain required information about their subjects and gain access to online lectures and online discussion chat rooms. ICT assists faculty researchers and scholars to find information very quickly through the provision of databases and search engines on PCs. In this and many other ways ICT benefits the work carried out by administrators so that they can execute the university's strategic plan and daily operations and procedures much more quickly and systematically, including providing distance learning and the associated learning materials (Gikas & Grant, 2013; Linn, 2004).

Administrators as well can benefit from ICT in the university context. It can help with communication between students and faculty members and make it easier. Many processes can be done automatically which will help to save staff time and budgetary costs by promoting self-service programs and initiatives. Administration also affects other components of educational institutions such as overall management of the institution, finance, and library services. Much time can be saved during the enrolment process as well (Alkhalaf, 2013; Jung & Shin, 2015).

3.2.1.3 ICT in Learning and Teaching

The history of ICT in learning and teaching began when Apple released the first personal computer in the late 1970s (Stein, 2011) and by the 1980s personal computers were being used in classrooms because they encouraged teacher-student interaction, and facilitated access to resources such as library systems (Beatty, 2013). Since the 1990s, teachers have employed various methods of enhancing the educational experience via technology. Teachers have used computer games, educational software and the Internet to improve the availability of information to students. Researchers have consistently pointed to the significance of information technology in the

workplace and highlighted the benefits of infusion into universities of electronic communication as a new method for teaching and learning that improves people's capacity to learn and solve problems. ICT also upgrades the organisation's efficiency. These in turn all rely on good infrastructure and how the ICT system is deployed in a university setting (Valtonen et al., 2013).

Faculty members and teachers are important users of ICT. Teachers need knowledge and skills that will enable them to improve their teaching, such as integrating information and communication technology (ICT) with the curriculum in order to enhance learning and allow students to learn from different resources (Shuva, 2010). When teachers use ICT in teaching their classroom role will be reduced while the students' role increases as students become more independent and responsible for acquiring skills and knowledge. Teachers should be motivated enough to use ICT that enables their courses to be taught to students more effectively. Students must have the ability to learn how to use ICT (Tarus, Gichoya & Muumbo, 2015). One teacher may choose to employ certain strategies in a manner that is consistent with his or her teaching methodology, while another may employ quite different strategies in a manner that is equally consistent with how he or she teaches.

Using ICT in learning and teaching has several benefits for both teachers and students. It encourages teachers to work in diverse ways and enables students to learn the content of their topics and how to be motivated and challenged in the way they are presented. Furthermore ICT opens up great opportunities to improve the quality of life of disabled people by allowing them to attend universities and lead more independent lives (Raskind & Stanberry, 2009; Torrisi, 2012) and in terms of when and where they learn as well as what they learn. By using ICT, student learn fundamentals concepts and operations of computing and the use of productivity tools such as word processing, spreadsheets, databases, graphics programs, search engines and email (Tinio, 2003).

3.2.1.4 Administrators' Use of ICT

Because of the advantages that developed countries achieved through the development of ICT in many services offered to citizens, many developing countries now focus on how to activate electronic services in their own systems. E-services such as e-government, e-business, e-learning, e-commerce and so on spread quickly because decision-makers in organisations recognise the importance of ICT and Internet and

how they benefit the user and organisation. ICT facilitates an organisation's ability to conduct many services and this in turn relies on having the infrastructure to activate ICT. However, any organisation must have well organised and planned ICT infrastructure to implement such services (Al-Mamari et al., 2014).

Many leaders and officials understand the importance of the implementation of ICT to improve services for customers. However, implementing ICT is not so easy and simple and benefits cannot be generated in a short space of time. Services providers need to apply a good long-term plan and framework to make implementation work. Also, organisations need educated people who can use ICT tools, and qualified ICT staff are essential to deal with private sector firms and act on their advice. (Abu Nadi, 2012).

3.2.2 E-learning

The e-learning concept has been around for decades and is one of the most significant developments in the information systems industry (Wang, 2003). E-learning is an ICT system which learners can access information no from any location or at any time, which many advantages over traditional learning techniques. A lot of research has been done in the field of e-learning and the success it has generated in education services. E-learning has been viewed as synonymous with Web-Based Learning (WBL), Internet-Based Training (IBT), Advanced Distributed Learning (ADL), Web-Based Instruction (WBI), Online Learning (OL) and Open/Flexible Learning (OFL) (Khan, 2005).

Adoption of e-learning for teaching and in organisations has created new opportunities for interaction in education and learning activities. Multimedia communities and virtual worlds provide a learning environment that stimulates learners' high order thinking and knowledge development and creates social groups. The client-server architecture allows users to access learning materials from a centralised server. The innovation in client-server architecture through web-based features opened a gateway for Internet/Intranet/Extranet technologies that provide virtual web-based environments. Now the development of wireless technology provides the opportunity to learn and study through portable devices (Alkhalaf, 2013).

3.2.2.1 The Importance of E-learning in Saudi Universities

Saudi Arabia is fast developing as an e-learning centre. It has also been noted that the number of Internet users is constantly increasing in Saudi Arabia with rising interest

in e-learning because ‘normal’ higher education is expensive to the government (Al-Asmari & Rabb Khan, 2014; Alkhalaf et al., 2010). It is important to acknowledge the fact that e-learning and e-learning facilities are frequently being developed in higher education institutions in Saudi Arabia. Asiri et al. (2012) contend that this can be described as a phenomenon that is attributable to the consistent increase in Saudi student numbers in higher institutions. For instance, during the 2013 academic year, there were 1.2 million students enrolled in the country’s twenty-eight universities. Presently, Saudi Arabian universities and colleges are encountering challenges stemming from overcrowding (Asiri et al., 2012). In reaction to this surging demand, using ICT from a general perspective is being viewed as the most valid solution to overcome this problem. Nonetheless, the pressing need for the adoption of e-learning and computer technology in higher education in turn implies that faculty staff in Saudi Arabia must incorporate ICT into their classrooms and employ ICT resources as part of their teaching duties (Al-Khalifa, 2010; Asiri et al., 2012).

On the downside, universities in Saudi Arabia are similar to universities in other developing countries in the sense that they experience staff shortages particularly in the medial and applied specialisations. One of the most significant benefits of e-learning is that it assists in less dependence on the teaching staff at the local level according to Alzamil (2006). The issue of staff shortages can be solved significantly through the utilisation of e-learning. This is because the Internet makes it possible to design interactive course material that can then be delivered via a network to students who are located elsewhere (Clark & Mayer, 2011).

The system of education in Saudi Arabia is one in which there is an absolute separation of staff and students in terms of gender (Asiri et al., 2012) with separate staff and buildings for female and male students. Consequently, this poses a major impediment on accommodation and available resources. Alaugab (2007) asserts that the number of female instructors compared to their male counterparts is significantly less at every academic level in Saudi Arabia. To this end, it is necessary to encourage the introduction of e-learning tools for the provision of e-courses for Saudi female students in various faculties. This is because such an arrangement will lead to a demand for fewer female instructors according to Asiri et al. (2012).

Albalawi (2007) asserts that using information technology in Web-Based Instruction (WBI), distance learning or e-learning could be a way of dealing with the challenging circumstances in countries offering their citizens access to technology. In addition, the faculty's role in higher education throughout the world is shifting in response to the rapid technological advances (Albalawi, 2007; Alshwaier et al., 2012). In relation to WBI, Albalawi (2007) concluded that the general attitudes of faculty staff were positive. In fact, he found that faculty members believe that online courses represent Saudi Arabia's future in higher education. Furthermore, faculty members also believe that WBI has the capacity to enhance learning among students and motivate students to take extra interest in learning. Overall, WBI promises to be an excellent teaching tool for counteracting and compensating for gender segregation in the higher education system (Albalawi, 2007). The introduction of WBI as a form of e-learning in the higher education system has the potential to pose a challenge for faculty staff according to Albalawi (2007). According to Mirza (2007), e-learning represents an excellent substitute for numerous students in Saudi Arabia who are interested in obtaining a higher education degree from international universities that have good reputations, but are unable to travel overseas due to financial, employment or family obligations. Moreover, e-learning in the industrialised world has registered impressive success since it provides students with flexibility and convenience associated with cost, time and study pace (Mirza, 2007). While there are numerous other reasons as to why Saudi Arabia needs e-learning, those reviewed here are the most important.

3.2.3 ICT Infrastructure

ICT infrastructure is a key element in many organisations. This infrastructure is composed of a set of hardware, software, services, procedures, processes and persons, comprises procedures, rules, and persons that interact with each other and the wider environment to produce digital education. With this vision we have to consider that ICT infrastructure is a complex system (Baquero et al., 2006). The main components of ICT infrastructure are computers, network and the Internet, display screen technologies and peripherals and software and information systems. ICT encompasses a wide range of technologies including telecommunication technologies, such as telephony, TV, radio, cable and satellite, video-conferencing and computer-mediated conferencing, as well as digital technologies, for example computers, software

applications and information networks (Internet, World Wide Web and intranet) (Ingutia-Oyieke, 2008; Walmiki & Ramakrishnegowda, 2009).

Availability of technical equipment and access to it are important factors that promote the use and integration of technology. Also, increased access to computers and the Internet on and off campus is an essential component in reducing the barriers and increasing the use of technology in higher education. It is necessary to update technology in order to reach more effective levels of instructional technology applications in higher education institutions (Almuqayteeb, 2009).

3.2.4 Successful Integration of ICT

An Information Technology Plan (ITP) is the key to developing education and the implementation of information technology in universities involves key stakeholders' (administrators, faculty members, and community members) wants or needs (Shim et al., 2014). Stakeholders include business and public organisation members who try to develop and integrate their information and ideas to develop a reasonable plan. An effective ICT planning process helps universities or education leaders to determine the appropriate roles of information technology in learning and teaching, research, outreach, and management, and to predict how these roles might change over time (Shim et al., 2014). ICT planning can also enhance the educational institutions' environment and ensure that education programs, courses, etc., are administered and taught more smoothly. To get good results from ICT integration requires careful planning (Al-Oteawi, 2002).

It is very important to focus on the university's strategic priorities if ICT integration with teaching and administration activities are to proceed in an efficient and orderly way, and especially where using ICT is essential to this process (Bowden et al., 2014). ICT has set in motion fundamental changes in the nature of higher education, and ICT professionals have the potential to be agents of transformation. While this is not easy to accomplish in a college or university, such change is necessary and inevitable (Bøe, Gulbrandsen & Sørebø, 2015). The managers or those in control of a university must build a team and shape the organisation so that it functions effectively. Teamwork will help to achieve successful implementation of processes and strategies. Building a collaborative team requires a framework for decision-making where working collaboratively and consistent ICT processes are essential. The Information

Technology Plan will help develop a university's mission, goals, and objectives and help meet students', teachers' and administrators' changing needs in order to increase the universities' productivity. An ITP is a road map that helps the university to attain its goals on time and at low cost (Koester, 2011; Shim et al., 2014).

3.3 Barriers to Using ICT Effectively

Using ICT in organisational environments is crucial because the benefits outweigh the disadvantages (Bingimlas, 2009). Therefore, organisations must find ways to enhance ICT and integrate it in every part of their processing systems. It is important to identify barriers so that decision-makers can overcome them and thereby become successful technology implementers. ICT helps to reduce costs, and many studies have identified barriers or problems that need to be overcome (Bingimlas, 2009). Organisational barriers often result from not having the correct ICT infrastructure in place such as good buildings, proper equipment, servers, networks, etc. When systems are not functioning properly inadequate ICT infrastructure can lead to important data being lost, damaged or infiltrated, etc. Without good technical support in their organisation, resource managers and administrators cannot overcome the barriers that are often linked to ICT. Effective training is one of the strongest support strategies that staff can use when ICT has to be used effectively and properly (Al Gamdi & Samarji, 2016; Al Mulhim, 2014).

Many staff lack confidence when using ICT for various reasons, such as feelings of inadequacy, insecurity and fear of failure (Bingimlas, 2009). Also, staff members' attitudes and an inherent resistance to change are a significant issue that forces changes in organisations' systems and how to deal with ICT (Khan et al., 2012). Many researchers have argued that resistance to change is an important barrier to use of new technology in the workplace because workers may not have the knowledge to use ICT, which affects their motivation to change (Bingimlas, 2009; Al Gamdi & Samarji, 2016). In addition, many ICT-related problems are the result of a lack of staff competence in integrating ICT into their duties (John, 2015). In developing countries such as Saudi Arabia and Syria, for example, ICT skills are a serious obstacle to the integration of technology into organisation systems (John, 2015). Finally, while many staff may be competent in using ICT they still make little use of it because they do not have enough time to master all the technical details (Bingimlas, 2009).

The last barrier occurs at the student level and this one overlaps with the other barriers. Firstly, students usually do not have enough income to purchase or hire rapidly changing hardware and software technology and therefore how much money is spent on a university ICT system is a critical issue. Many students who do not have much technical knowledge about ICT may experience ICT-related problems. Studies show that students in developing countries such as those in Africa lack integrated ICT systems where support and services to facilitate their learning are lacking (Hennessy, Harrison, & Wamakote, 2010; Abu-Al-Aish, 2014). Moreover, lack of access to resources such as at home is a complex problem that discourages students and teachers from integrating new technologies into university courses. Students are worried about how difficult it is to have 24-hour access to computers or networks to do their homework or research. International students experience many difficulties with language because much of the software and applications are in English and worded in jargon with which they may not be familiar. Many international students use ICT to do their assignments but they first have to learn the basics of a software application language (Mehra & Bilal, 2007).

3.3.1 E-government

Saudi Arabia's universities are government institutions (Smith & Abouammoh, 2013). They have different departments, faculties and mix of staff skills, qualifications, etc. Some features of e-government services will make them more appropriate for universities and other high education institutions (Farzandipour & Meidani, 2014). This section will discuss several studies that have investigated problem which affect implementing e-government in different regions.

3.3.1.1 Saudi Arabia and the Gulf States

Alshehri and Drew (2010) used a mix of qualitative and quantitative research methods to describe the challenges and barriers that affect the implementation of e-government services in Saudi Arabia. They found that organisational, technical, social and financial barriers exist. They also ordered and ranked these results based on an online survey questionnaire. According to this study, technical barriers and challenges pose a significant problem in integrating ICT in Saudi Arabia and these issues include ICT infrastructure. Indeed, 62.8% of respondents indicated that weak ICT infrastructure is considered to be the major issue where old infrastructure has not been upgraded, or where there is no network file server, etc. Their study also concluded that security and

privacy of information is another serious technical barrier, with more than 46.6% of the participants in the study indicated that this issue is significant.

According to Alshehri and Drew (2010), organisational barriers constitute another category for problems described in the above-mentioned study. Here, 44% of the respondents stated that there are not enough ICT professionals working in these organisations and this is because such experts are leaving the public sector to go work in the private sector where the salaries are better. There is resistance to changing electronic systems and this is also compromising better implementation. Moreover, Alshehri and Drew (2010) point out that to use technologies in an effective manner requires an equally effective supporting policy and regulatory framework covering all aspects of communication and work practices such as e-mail usage, copyright rules, e-crime, etc.

Alshehri and Drew (2010) investigated that lack of partnership and collaboration represent another significant barrier that slows down the integration of ICT. Sharing of information and data between and within institutions safely and securely can have many benefits. According to Alshehri and Drew (2010), in Saudi Arabia this problem is reinforced by the lack of programs that promote the benefits of using ICT. Also, the lack of a strategic ICT plan is readily apparent and in Saudi Arabia, as with other developing countries, there is a problem of integrating ICT in the overarching culture where languages, education, religion, and different expectations predominate.

Alshehri and Drew (2010) also found that leaders and senior management support is another challenge that impacts on ICT integration. According to their survey findings, 32.3% of participants identified the lack of senior management support, which ranked as the sixth most important problem. Finally, the study found that financial barriers were the least important in that implementation includes limited financial spending on ICT, high cost of ICT and high-priced services concerning telecommunications.

Alshehri and Drew (2010) provided recommendations that should lead to better e-government services being implemented in Saudi Arabia. For example, they suggest a strong and modern ICT infrastructure in all Saudi governmental organisations and agencies. Security and privacy are critical issues that need to take the highest level of priority in e-government implementation processes. Moreover, creating a uniform strategic plan for e-government projects is the first step for the successful adoption of

e-government services. Each government organisation's strategic plan should include the development of processes and policies, purchasing and maintenance of hardware and software, development of operating environments and services, management, outsourcing of consultancy, and ongoing training courses for all staff.

In a similar context, Omari (2013) investigated the most important challenges regarding the implementation of e-government in the Arabian Gulf Countries or the so-called Gulf Cooperation Council (GCC), of which Saudi Arabia is a member. Firstly, he mentions the importance of infrastructure and how critical it is to take into account different technological advances such as mobile phones and accessing them. Also, the e-government infrastructure needs to be designed to serve special groups in society such as disabled citizens and citizens with low or poor ICT skills. Helping them will increase their acceptance and use of e-government services.

Secondly, the availability of laws and regulations that control the relationship between different e-government parties is essential. Therefore, policy issues constitute one of the important influences on the implementation of government policy. Moreover, Omari (2013) points out that the availability of trained and skilled employees who can handle e-government transactions and control their flow is essential. He suggests that the governments should initiate a range of training programs and strategies to overcome this problem. Furthermore, governments should also adopt continuous learning strategies so that employees remain updated in terms of technological expertise that their jobs demand.

Omari (2013) also points out that employees' resistance to change and fear of change are very important reasons that may affect implementation. These challenges can be overcome by encouraging employees and convincing them that this transformation will not affect them negatively but will in fact give them the benefits of learning about new technologies and finishing particular transactions more quickly. In addition, Omari (2013) points out that the governments must have a defined strategy to overcome the difficulties from the change to e-government. This can be done through doing different projects, studies and research, etc., related to different aspects of e-government such as cost, infrastructure, training, and other issues.

Cultural differences represent another critical issue that may affect e-government implementation. The design of e-government services has to consider cultural

heterogeneity within the country's borders, issues of gender, age, profession, education, ethnicity, religion and social class, etc. Doing so will avoid the slow and confused nature of e-government adoption and functionality. E-government should respect and consider various cultural differences within society. These factors should be taken into account when implementing an e-government project.

Finally, Omari (2013) points out that the ease of utilising e-government services is based on participants' ability to use the Internet. He suggests that the greater one's Internet experience, the easier it would be to learn and use e-government services. He concludes on the challenges of adopting e-government in the GCC when considering an e-bureaucracy. The fear of e-government bureaucracy is forcing the user to follow unnecessary and complicated procedures when completing government transactions is critical. The author recommends that overcoming such drawbacks and disadvantages requires developing 'user-friendly' websites.

3.3.1.2 Developing Countries

Nawi, Rahman, and Ibrahim (2011) considered perceptions of senior officers who manage and monitor ICT projects in government agencies in the Malaysian public sector. This study involved only 6 respondents who are Malaysian government officers, to investigate the failure factors which could be classified into the six generic types of ICT project failure. Firstly, they mention that one of the most important reasons is project management factors. They point out that according to one interview, respondents said most projects do not meet user requirements because of vendor-related problems. Another response noted the inability to manage the project risks before problems occurred. They point out that lack of managing risk in an ICT project is essential. A better risk management strategy is critical for the ICT project to succeed in the public sector environment.

Nawi et al. (2011) contend that underestimating the complexity of the project task and activities also leads to more resources required to resolve the resulting issues. Furthermore, inadequate project planning causes a delay in project implementation, which results in inappropriate systems with outdated design and obsolete technology being accepted. Another commonly occurring issue is when either side fails to adhere to the contract during the project as a result of inadequate resources or contract management or changes in the control/management processes. All these issues occur

because of the lack of an overall skilled project manager and sometimes not having the right team. It is important that project managers and project teams in ICT projects have the appropriate technical background and relevant experience.

The second factor in this study is the effectiveness of senior management. Nawi et al. (2011) point out that it is very important that senior management be supportive of a project and can provide the necessary resources. Senior managers of an ICT project who lack the required ICT knowledge will make poor decisions and eventually cause the project's failure. The third factor relates to technology issues when there are problems with design, integration, obsolete systems, personnel qualifications, etc. This issue will affect the quality of the end product. Compatibility between ICT systems is already a major issue especially where a number of agencies are involved in one project.

Moreover, the authors point out that there are other factors related to the organisational level. The interviewees commented that due to an economic downturn scenario, the budget of a project will be slashed by the government so that projects are not completed. Nawi et al. (2011) point out another factor and this is the size and complexity of the projects causing delays and frequent budget overruns. The number of agencies involved is too high and it becomes complicated because their business processes are either too similar or too different. Central steering of the project is difficult or sometimes even impossible in these cases. Finally, process factors play a role. Projects that proceed without any prior feasibility study will fail, according to two respondents. They also state that if there is a project selection method, the government does not have an appropriate ICT project evaluation process in any case. Also, lack of business process reengineering, and standard methodology for execution is another issue which causes project failure.

Ziaie (2013) discussed the existing challenges and solutions for the ICT industry in a developing country and used Iran as an example. Interviews with a number of ICT professionals and government authorities were conducted for this study. This particular study organised its results into four categories -- legal, human resources, technical, and political -- and the impediments facing each one. Firstly, Ziaie (2013) mentions that many developing countries do not have the necessary rules and legislation to properly control all technology issues, such as disputes regarding

privacy, content ownership, security breaches, etc. He suggests that to solve this issue the legislative body should customise rules and policies from developed countries. Another issue related to this category is the slowness with which legislation is implemented.

Second, Ziaie (2013) points out that due to having natural resources such as oil or diamonds, countries sometimes neglect or underestimate the value and importance of human resources. They focus on how they can exploit high-tech technologies and facilities instead of acquiring the necessary knowledge to develop technology and foster innovation in people. Another related issue in this category is having an inappropriate academic curriculum or ineffective education programs. Science and technology education plays a decisive role in sustainable development.

Moreover, Ziaie (2013) highlights the importance of technical infrastructure to ICT deployment and development, especially electricity and communication networks. Lack of communicational infrastructure hinders the effective application of ICT and makes reliable and fast access to online resources challenging. Ziaie (2013) also noted that having a larger rural population imposes additional difficulties in providing technical infrastructure in developing nations. Due to legal, financial and personal constraints, developing countries face difficulties in, for example, procurement of high-tech facilities and certain technologies. There is a lack of knowledge, skills or expertise and this may cause incomplete deployment of ICT systems, information theft or loss of data, which may have severe security consequences and puts a country at the risk of cyber-attacks (Ziaie, 2013).

The final factor that Ziaie (2013) notes which may affect the ICT industry in a developing country is political issues. Patenting and aggressive intellectual property rights (IPR) and global and internal politics play an important role in knowledge transfer and technology acquisitions. This issue has a drastic impact on the accessibility of certain technologies or knowledge and has a major influence on the direction and depth of technological advances. Countries that are involved in international conflicts or disputes may be affected by a law restricting a technology based on religious arguments. For example the Iranian parliament in 2006 restricted the Internet bandwidth, and Saudi Arabia only introduced television in the 1960s and mobile phones with embedded cameras in 2005 (Ziaie, 2013).

In other countries some technology services have been banned, this decision being based on internal politics regarding ICT such as in Iran, where possessing a satellite receiver and watching unauthorised TV channels is still a prosecutable offence. China is engaged in censoring some Google services and during the recent uprisings in Egypt and Tunisia social media was closely filtered. Furthermore, managing large projects suffers from senior management authorities not being familiar with complications occurring in ICT projects and can lead to setting unrealistic deadlines. As a result, projects either fail or the outcomes are drastically different from the envisaged goals. Also, information transparency which is one of the benefits of introducing ICT is a big issue for decision-makers in more corrupt developing countries because it is as a threat to their very existence. Therefore, governments are unwilling to fully adopt ICT in their countries' technological systems and processes. In short, without the support of decision-makers in the government, the full adoption of ICT can never be achieved.

3.3.2 Education Systems

Reid (2012) uses a fishbone diagram (Ishikawa) to review papers on the most important barriers to the adoption of higher education instructional technologies. He categorises barriers into five groups: 1) technology, 2) process, 3) faculty, 4) environment, and 5) administration. Firstly, Reid points out that technology has little impact on learning without institutional changes. This factor includes a few key issues: access to technology, reliability and complexity. Many faculty members in different programs or courses are dissatisfied with the availability of technologies and distribution of available resources and this, for them, is a major problem. This can be worsened by the extra tasks required of faculty members who want to use technologies because they sometimes are responsible for obtaining, setting up, and then returning projection units, laptops, or other hardware they need in the classroom which causes them to become frustrated and potentially decide that the benefit is not worth the extra work.

Reid (2012) found that instructors do not always trust the available technology which causes the development of multiple forms of materials to become a complex process. With reference to reliability, this issue arises when institutions use low quality equipment. The final issue in the technology factor is complexity. The multiplicity of instructional technologies and tools, and the capabilities and limitations of each, can cause confusion. Many technologies used in courses were not created for education

and therefore not always suitable for university faculties. Also, technologies change through revisions, upgrades, or replacements, and this can cause complexity. Faculty members must revise both their use of the old functions and determine if new functions provide better avenues of instruction or meaning. Instructors may struggle to identify which technologies and tools are the most appropriate for their work which discourages them to use it because it will take an inordinate amount of time to get this aspect of their work right.

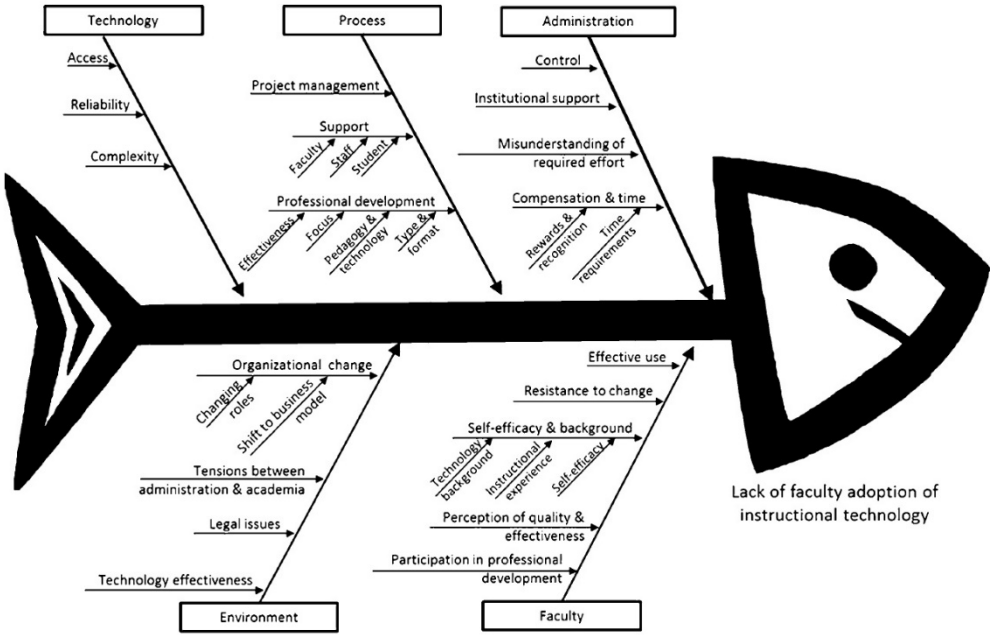

Figure 3-1 Fishbone diagram of barriers to adoption of instructional technologies (Reid 2012)

Reid (2012) notes the role of the process factor in adopting instructional technology, including project management, support and professional development. It is important to deal with implementation as major changes in the institution occur by consulting with staff and implementing a good plan to avoid accidents and liabilities, which can be expensive. All institutions' stakeholders have to contribute to the plan. If not, some issues with the project could happen such as lack of a clear vision, poor leadership, critical mass, incentive, and faculty participation. While a group of stakeholders may provide an implementation plan, other stakeholders might not follow it due to: a) a limited vision of the future, b) comfort with the way things are, c) deficits in information and communication, d) people being uncooperative, and e) lack of the skills needed to do what the leader is proposing.

Reid (2012) points out that, even when implemented correctly, providing help through support is the second issue in the process factor. This support should be provided to all stakeholders: faculty members, staff and students to help them to use instructional technology because lack of support can affect implementation, reduce the level of support and compromise instructional design/development support. To overcome these issues training is not the only solution but the institution has to deal with all of them. The last issue in the process factor is faculty professional development. Lack of staff skills and knowledge about technology is a big problem. Most staff think that organisations are entirely responsible for improving their skills through training programs being offered. However, professional development (PD) for staff on a range of technologies sometimes does not work very well because they are not learning the technologies and then using them.

Administration is the third factor in the successful adoption of technology in institutions, i.e. technology control, institutional support and leadership, misunderstanding of required effort and faculty compensation and time. Reid (2012) asserts the need to control purchasing decisions, access, and use of technologies. Many faculty members feel that decisions to purchase new technologies are made without faculty input and an overall plan for their instructional use which causes a negative impact on their teaching and learning decisions, and some fear these may lead to further controls on what they do. Moreover, a lack of institutional support, senior executive and management clarity, and complexity of universities is another issue that may leave faculty members and administrators without a clear idea of goals for using instructional technology. Also, misunderstanding from departmental leadership may cause unsuccessful adoption of technology because some administrators thought a move from a traditional way to an electronic way would be simple.

According to Reid (2012), another issue within the administration factor concerns staff compensation and time. This issue has two subcategories, these being reward and recognition barriers and time requirements. First, incentives and promotion are a very important way to motivate staff and can be based on faculty evaluation criteria. Another type of reward and compensation is to provide staff with the proper physical resources, including office space and classroom design, smaller teaching loads/higher release time, incentive grants, additional equipment and funding to support the development of technology materials. The second subcategory concerns using

instructional technology in a proper way as required. This may require a change in pedagogy and more time to learn the technology for the purposes of course development.

Reid (2012) discusses the fourth factor which may have a significant effect on adopting technology: the instructional environment. This incorporates organisational change, tensions between administration and academia, legal issues, and the effectiveness of instructional technology. Firstly, organisational change means changing roles for all stakeholders and a shift from an education to a business model. There are tensions between administration and academics and how this could affect the environment and implementation of technology. Legal issues can also be a problem such as intellectual property, piracy and copyright infringement and breaking copyright laws. The final issue in the environment factor refers to course and technological effectiveness. A lack of effective evaluation methods for distance learning courses and programs is a concern. There is no solid evidence of overall effectiveness which makes it difficult to improve the programs, determine appropriate use of technologies employed or determine their overall value.

The final factor in this study is the faculty which includes resistance to change, self-efficacy and background, perception of instructional technology effectiveness. Firstly, effective use of technology requires that the faculty members utilise instructional technologies properly. Sometimes they use instructional technology inappropriately or without making a positive difference in students' learning. Another issue within the faculty factor is resistance to change when using instructional technologies due to several reasons. For example, faculty staff may believe the technology is focused on increasing market share rather than improving teaching and learning, or that the institution or department/faculty is not realistic in its expectations, or that the new technologies are fads.

The third issue consists of two parts: faculty technical background, instructional experience and self-efficacy which help faculty staff to overcome some barriers. Having a technical background gives faculty teachers more confidence when they use the technology. Early adopters of technology are likely to be adventurous but this may be detrimental to the students if instructors drop content, force-fit the instructional technology, or use the technology for low levels of learning, often resulting in less

classroom interaction. Finally, technical competency is an important factor in the adoption of instructional technologies which leads to self-efficacy. The fourth issue in the faculty factor is perception of instructional technology's effectiveness. Many faculties express scepticism about proponents of technology, and many question its effectiveness, citing lack of evidence of benefit despite a great deal of research on successful web-based courses. The most common specific concern is loss of personal contact with students.

The final issue in this factor is participation in professional development which is not possible without a certain level of skills and knowledge to apply technology to their courses. Reid (2012) concludes by stating that understanding all the barriers, identifying and ranking them by the decision-makers in higher education is important if the best practices in supporting institutions are to be identified.

3.3.2.1 Saudi Arabia and the Gulf States

Bingimlas (2009) examined the problems concerning successful integration of ICT in learning and teaching in education environments in Saudi Arabia. He divided the problems into two kinds: teacher-level barriers and school-level barriers. He found that teachers have to deal with three important issues concerning ICT. First, the study found that lack of teacher confidence prevents teachers from using ICT. This is due to their fear of failure, teachers' limited knowledge of ICT and other reasons. Second, the study found that lack of technological competence is another barrier which is directly related to teacher confidence. Many studies in different countries show lack of ICT skills in the classroom prevents teachers from doing their job effectively. Finally, this study showed that resistance to change and negative attitudes severely compromised teachers' use of computer technologies in the classroom. In relation to school-level problems, lack of time was the first issue. Bingimlas (2009) concluded that many studies found that teachers have technological competence and confidence in using computers in education environments, but lack of time means proper use of online technologies cannot be achieved. A second school-level issue was, lack of effective training, which means that there is not enough opportunity to use ICT. A third issue that complicates the process is the lack of access to resources which discourages teachers from integrating new technologies into their job.

Finally, lack of technical support is the fourth barrier at the school level. Teachers experience ICT difficulties such as failing to connect to the Internet, websites not functioning properly, etc. Bingimlas (2009) discussed those results and found a relationship between the lack of teachers' competence and lack of access to computers and their back-up systems. These have implications for teachers and schools. For example, schools should provide training courses for teachers to help them to use ICT, and provide sufficient time to implement ICT in their teaching work.

Alwani and Soomro (2010) looked at the barriers of information and communication technology (ICT) in science education at the Yanbu school district in Saudi Arabia via a survey. Their study focused on science teachers in one educational district covering the 2003-2004 school year. In total, 176 questionnaires were returned by 105 male and 71 female science teachers, constituting 60% and 40% of those solicited, respectively. They listed problems concerning ICT integration and they divided the results according to gender. The study found that some male teachers agreed that lack of an ICT centre in the education district or in their schools and qualified trainers to train teachers and students to use ICT correctly are significant barriers that prevented them from effective applications of ICT. Also, many of the female teachers experienced the same problems that male teachers did such as busy schedules, teaching many subjects, and doing work outside their teaching job. All of these problems prevent them from applying ICT in their teaching practice. Female teachers like their male colleagues experienced a shortage in short course training and the high costs they would incur. The researchers summarised all the results into two related issues: no specific budget for ICT in school and lack of school funds to purchase hardware. They believe that this could be overcome if the Ministry of Education and the Yanbu educational district provided the necessary funding.

Ahmed et al. (2011) discussed some e-learning problems in Saudi Arabia and provided solutions to some of these issues. They point out the need to raise the number of Saudi Arabian users of the Internet and how leaders should facilitate new services to build new environments. Security and privacy issues were two of the most important issues resulting from the rise in the number of students. It is important to develop ICT infrastructure so that students can interact better.

Ahmed et al. (2011) pointed out some security concerns in e-learning. They discussed the importance of user authorisation and authentication in e-learning. Also, they highlight the importance of the entry points and how they could affect the e-learning system. The e-learning system may be infected from the students' side due to manipulations of the system. A possible solution to avoid this risk is by using encryption, digital signatures, firewalls, etc. The authors also pointed out another concern which is confidentiality, where it is critical that users cannot access any content less they are authorised to do so.

Ahmed et al. (2011) also mention their security concerns about the e-learning system by pointing out the need for integrity and the risk of destroying information without proper authorisation. Moreover, the availability of e-content is important to ensure learners maintain their interest. Finally, they pointed out the last step in information security which is Non-Repudiation. Any fraud could be created by a learner such as Trojan horses or viruses which will wreck the system. They then suggested some measures which could be applied to universities in Saudi Arabia to counter online security risks, such as SMS Information Security, Biometrics Information Security, Token-Based Information Security Mechanism, Access Control List (ACL) Mechanisms, and Digital Signature Information Security Mechanisms. These can all be used to avoid problems of identification and authentication.

Algahtani (2011) discussed e-learning's effectiveness which was evaluated at two universities in Saudi Arabia, through male learners' perceptions. In total, 300 questionnaires and the results documented no significant differences attributed to specialisation or age due to the popularity and widespread use of ICT among all specialisations and age groups. Algahtani (2011) concluded that e-learners believe they can learn independently, at any time and everywhere, and at any pace, by choosing a suitable learning strategy, receiving immediate feedback, and evaluating their own learning.

Also, learners who have used e-learning are satisfied by the quality and degree of their interaction with the content, perceiving that e-learning leads to measurable outcomes and helps them to maintain a positive attitude to learning and raising their expectations. Additionally, learners' interaction with the instructors also shows that learners felt that they interacted well with the instructors, but slightly less so amongst themselves. They

enjoyed connecting with their instructors through e-learning, building productive relationships and were encouraged to discuss issues with their instructors. They preferred to communicate through e-learning rather than through traditional settings and, in this study, they felt that they received more of their instructors' attention in the e-learning environment.

Moreover, the results show the need for technical support for their ICT skills. Learners pointed out some communication problems between learners and instructors due to overloaded work duties. They also worried about obtaining electronic references. Learners indicated their need for training to improve their skills as part of the e-learning programme. Moreover, planning, infrastructure, finance, policy and human resources, and protection of intellectual property all represented areas that required attention, according to the learners' perceptions. Outcomes revealed some barriers such as technical problems, viruses, inadequate designs, apathy, lack of ICT-related knowledge, lack of finance, and problems with the credibility of cyber content and the availability of Arabic language sites. A set of proposals made by the learners to develop e-learning emerged, the most important being the provision of financial support, protecting hardware and software adequately, having interesting teachers, better training, and providing Arabic language sites.

Algahtani (2011) made some key recommendations. The first was for universities to instigate innovations to improve e-learning. The second was for the Ministry of Higher Education to recognise e-learning qualifications as being equivalent to traditional education certificates, diplomas, degrees, etc. In addition, he recommends e-learning software producers pay more attention to meeting learners' requirements if they were to profit from them. The fourth recommendation referred to the government's officials improving the implementation of e-learning in Saudi Arabia, through the Ministry of Communications and King Abdulaziz City of Science and Technology.

Alhazzani (2013) investigated the challenges facing the implementation of ICT from the perspective of academic and administrative leadership at King Saud University (KSU). KSU is one of the biggest and oldest universities in Saudi Arabia and it has enjoyed the largest budget in the last 10 years due to its influence in the Ministry of Higher Education. Alhazzani (2013) also provided recommendations for the KSU's leaders to overcome these challenges. In total, 51 questionnaires provided to the

university's leaders led her to conclude that training staff to operate and maintain ICT system, awareness of security issues and English language skills are critical. The second recommendation involved mastering technical challenges, which include lack of manuals, lack of maintenance, monitoring and updating systems, good infrastructure and understanding the complexities of managing ICT systems. Administrative challenges constitute the third recommendation, specifically lack of performance criteria to monitor workers' ability to use technologies, lack of suitable policies, and tendency to use traditional methods of work and routines. Finally, she highlighted financial challenges which include lack of private sector contribution, lack of material support for: analyses and studies in this area, training programs and personal training in the workplace.

Alhazzani (2013) concluded with some recommendations such as encouraging the private sector to provide advice on financial challenges of utilising ICT. Staff in public and private sectors must improve their ICT skills and English language skills. It is necessary for responsible people in public and private sectors organisations to provide ICT guidelines and manuals, and establish training courses, conferences, workshops and lectures to improve people's ICT knowledge. In addition, she recommended that it is very important that researchers and experts focus on this area to remove barriers and challenges for the effective use of ICT in public and higher education in different sectors. Finally, providing financial and moral incentive for staff in higher education will encourage them to improve their ICT skills and keep developing these.

Alarabi (2013) identified the challenges of utilising e-learning with faculty members teaching Arabic to non-native speakers in Saudi Arabia. In total, 40 questionnaires were collected from faculty member in Imam Muhammad bin Saud Islamic University and king Saud University who teach Arabic to non-native speakers. The questionnaire included three themes that were analysed, these being human, university and technological challenges. Human challenges constituted the most important problem and the lack of ICT resources and other materials is very significant for faculty members. Poor ICT cause other psychological challenges such as lack of motivation and desire to understand e-learning in the classroom. Alarabi (2013) noted the challenges which students have when dealing with e-learning. Many students who come to study the Arabic language in Saudi Arabia are on a scholarship and usually

from poor countries that have bad ICT infrastructure. These students are not familiar with computers and the Internet.

The researcher also identified some university challenges which included lack of ICT resources in classes, slow network on campus, lack of motivation in the university to get students interested in e-learning, lack of Internet connection in classes, lack of training offered to use e-learning (including faculty members), no Internet resources on the website of a university about e-learning, lack of training for faculty members to help them to improve their ICT skills, and leadership that think ICT is not useful. Finally, he pointed out some technology challenges which included lack of e-books about teaching Arabic to non-native speakers, no strategic plans to use e-learning, no department for producing electronic courses materials, lack of programs to teach Arabic to non-native speakers, lack of technical support in classes, lack of leadership support, and lack of rules and regulation for e-learning.

Al Gamdi and Samarji (2016) investigated the challenges to adopting e-learning in higher education by focusing on one recently established Saudi university as a case study. A number of barriers which challenge the effective implementation of e-learning were found in a quantitative data analysis using 214 questionnaires given to faculty members. They found that the most cited barriers were external ones which include concerns relating to students' lack of training in e-learning, poor Internet network, lack of ICT support, lack of instructional design support for e-learning, lack of an institutional policy for e-learning, inadequate availability of hardware and software, etc. One of the most significant external barriers concerns strategic policies which need to be in place to overcome such problems. Once these are overcome the focus can shift to internal barriers which include the quality of e-courses, lack of incentives to adopt e-learning, being intimidated by technology, lack of adequate English proficiency, and no role models to follow.

All of these barriers can be eliminated by providing proper and targeted funding. Surprisingly, all the universities in Saudi Arabia are funded by the Ministry of Higher Education so they should have the proper technical and financial support. Most faculty members lack enough external resources and this also affects female faculty members even though they perceived fewer e-learning barriers than their male counterparts. The authors suggest that HEIs need to implement strategic policies to promote ICT in

education (ICTE) and e-learning to promptly ensure that high-speed Internet access and reliable networks are available for all staff members.

Al Mulhim (2014) reported on some of the reasons for teachers not using information and communication technology (ICT) to its full potential. The author reviewed a number of studies from different countries, particularly Saudi Arabia. What hinders teachers' use of ICT is lack of access to technology, lack of training and lack of time. Lack of access could be due to inaccessibility or unavailability, and it is school level barriers which prevent teachers from using ICT to teach their students. These barriers include various factors such as lack of access to hardware and software, poor quality and dated hardware, and inappropriate software. In Saudi Arabia, Al Mulhim (2014) highlights the problem of lack of integration of technology in schools such as no hardware and no Internet access, absence of Arabic educational software, and the lack of a suitable site for ICT integration, such as a resource room and/or a laboratory. The lack of access to adequate computers to meet the needs of a large number of students is also an important issue. Teachers' training and professional development is the key to improving any education system. Absence of training means schools do not fully benefit from educational technology, especially when it is not effective because such technology is of poor quality.

Many teachers suffer from not knowing how to use particular technology or how to integrate it into their teaching. It is a very critical issue that most training courses are faced with in terms of technology itself. The important thing is that ICT should be integrated into teaching pedagogy. Al Mulhim (2014) also states the importance of having good quality training courses if they are to be effective. These training courses will assist teachers to be more confident in using technology. Finally, many studies point out that a lack of time is one of the most significant barriers preventing teachers from being able to use technology in teaching, prepare technology-based educational materials or to attend training and plan how to integrate it into their curriculum. Al Mulhim (2014) notes that the Ministry of Education in Saudi Arabia should update educational policy to solve some of the barriers mentioned above. Providing technical and pedagogical training courses for all teachers at all stages of their career is very important. Before all of these recommendations can be implemented, technical and pedagogical skills are the necessary pre-requisites.

Altameem (2013) identified four major technical issues in Saudi Arabian universities, these being ICT infrastructure, security, access (on-site and off-site) and ICT support. It is very important to have a proper ICT infrastructure to implement e-learning. Many Saudi universities do not have adequate ICT infrastructure which means they cannot develop and maintain their own systems. Altameem (2013) remarks on the importance of a reliable protection system for education files and records from security threats which have a significant effect on educators' attitudes to system use. Moreover, this paper revealed the importance of access to the e-learning system for all stakeholders. A widespread issue in Saudi Arabia concerns Internet services which are not only costly but also beset by poor connectivity. Finally, Altameem (2013) indicated that there is a strong relationship between ICT support and system delivery. Those universities with efficient ICT support structures are more confident in implementing e-learning. Altameem (2013) concludes with several recommendations for researchers, education leaders and developers that could aid ICT's implementation in Saudi Arabian universities. University decision-makers have to offer an acceptable and efficient level of ICT infrastructure and increase bandwidth speed. Otherwise, teachers would need to change e-learning content or employ less graphics and multimedia elements in order to meet the current bandwidth limits. Universities need to monitor the e-learning system to ensure appropriate fulfilment and level of ICT assistance such as the availability of help desks, and other online ICT support services.

Asiri et al. (2012) examined the external and internal variables or factors affecting the use of learning management system (LMS) in Saudi Arabia's higher education sector for teaching and learning purposes. The internal variables consist of factors relating to users themselves such as the attitude of Saudi Arabian faculty members to LMS, their beliefs about e-learning, and their competence level in using LMS. The success of implementing technology in an educational program depends strongly on the attitudes of the faculty members involved. Faculty members who have a positive attitude to technology feel comfortable in using it and are more ready and likely to be motivated to overcome obstacles. Also, the lack of technological competency to handle a wide range of varying computer applications is one of the main reasons for faculty members refusing to integrate new technology into their teaching. On the other hand, the external variables include challenges faced by the faculty members and demographic factors existing outside the environment such as organisational, technological, and

social barriers, gender, computer experience, and training. Organisational barriers refer to the institutional arrangement that supports technology implementation in the classroom. Technological barriers are typically, limited access to useful, relevant, and appropriate hardware and software.

According to Asiri et al. (2012), technological facilities play a key role in the faculty members' decision to participate in LMS. Administrative and technical support act as a major obstacle to faculty members' use of computer technology. Also, demographic factors such as gender, computer experience, and training are antecedents that determine the level of technology use by faculty members. In Saudi Arabia, the education system is organised according to gender segregation. For this reason female staff perceive ICT in the instructional process as less beneficial and more challenging to use, and that the behavioural intention to use an e-learning system is less than that exhibited by their male counterparts. Also, computer experience has been identified as another factor influencing the extent to which faculty members use it in their lectures. Moreover, training and professional development contribute significantly to the success of technology implementation in higher education. Regarding gender and training issues, Saudi Arabian female faculty members needed more in-service training so that they could use computer systems effectively.

Almalki and Williams (2012) investigated barriers that prevent successful ICT implementation in the primary school sector. The three significant factors here are: teacher, school/institution and extrinsic issues. The teacher factor includes three significant barriers, these being lack of teacher confidence in using ICT, lack of teacher competence which undermines teachers' confidence and teachers' negative attitudes because they believe there are no appropriate rewards for using it. They perceive there is no relationship between ICT and effective teaching. Institutional issues which comprise the second factor include several barriers: lack of time to search suitable resources on the Web; preparing photos and videos for multimedia presentation; lack of efficient training for teachers in digital literacy; pedagogical and didactic training impedes teachers' application of ICT in the classroom; lack of local technical support; and school leaders not providing support because they do not understand ICT.

Finally, with reference to extrinsic factors Almalki and Williams (2012) include local culture. In Saudi Arabia life is based on the Islamic religion, there is a lack of funding

support for the supply and maintenance of this technology in the classrooms, and lack of appropriate planning. There should be in place a comprehensive plan to deal with simultaneous problems that are common: lack of appropriate planning, lack of funding support, coping with different aspects of local culture and lack of effective training.

3.3.2.2 Developing Countries

Developing countries' education systems have many similarities. Salehi and Salehi (2012) did their study in Iran which has similar characteristics to Saudi Arabia. They used a quantitative research method based on teachers' experiences to determine the challenges in using ICT in high schools. They presented their results and findings into two sections: firstly, teachers' familiarity with ICT and the results are categorised according to the challenges; and secondly, barriers preventing teachers from using ICT in the classroom. In the section on teachers' familiarity with ICT their questionnaire incorporated three items, and they found that 70% of high school teachers considered themselves to be frequent or confident users of ICT. In the second part, 76.6% never used ICT in the classroom or they preferred to use it very little. In the last part, 83.2% believed that their colleagues were not familiar with ICT or used it rarely.

The second section concerns barriers preventing teachers from using ICT, which aimed to explore the teachers' perceptions based on a list of 8 factors deterring them from using ICT in the classroom. Salehi and Salehi (2012) found that teachers believed that insufficient technical support and little access to the Internet and ICT deterred them from employing ICT in the classroom. Shortage of class time and in fact the time needed to learn how to use ICT was another significant barrier when teaching the curriculum. On the other hand, more than two-thirds of the respondents believed that their colleagues' negative attitudes and their school's views about ICT did not influence their perceptions of ICT in the classroom. The authors also noted that more than half of the surveyed teachers stated that society's views about ICT and qualifications requirements do not hinder their use of ICT applications. They finally concluded that other people's opinions regarding ICT do not influence teachers' perceptions of using ICT applications.

The importance of information and communication technology planning in education system in developing countries has been emphasised by Malapile and Keengwe (2013). They described the importance of ICT in education and its direct and indirect

influence. Integrating technology in school involves training and planning. They described how an ICT program initiated in developing countries can be funded by development agencies, donors and private sector companies without any government involvement in the process. Malapile and Keengwe (2013) highlighted the strategic planning processes in most developing countries involve setting up a structure and designing implementation plans by expert representatives.

Malapile and Keengwe (2013) listed some challenges to ICT planning and implementation in developing countries such as diffusion of technology, low income levels, irrelevant content, lack of ICT access by minority groups, and lack of financial sustainability plans. The dominance of the English language discourages ICT companies to operate in some developing countries. There can be a lack of information on ICT policies, uncoordinated planning approaches by governments, and the management of partnerships with external organisations to access resources may be unsuccessful. The researchers also noted the barriers to integrating ICT in education according to school principals. These principals remarked on the problem of untrained teachers, lack of electricity, socio-economic status of the community, insufficient security resulting in vandalism and theft, curriculum constraints, unfavourable teacher: learner ratio, and lack of classrooms suitable for computers. Moreover, they discussed the over-arching problems of not having a department of education, poor planning and infrastructure, poor education systems, and socio-political conditions. Some poor countries do not have e-waste plans where they can receive donated technology equipment to get ICT implementation started.

Malapile and Keengwe (2013) documented different approaches used in developing countries, and how these influence planning, management and implementation of ICT in education. The ministries or departments of education must engage in the formulation of ICT policies, collaborate with other ministries and supervise implementation. These authors focused on the factors that affect planning and implementation such as lack of national governmental vision and leadership. The development of a technology-planning framework for developing countries' schools refers to several models: the Diffusion of Innovation (DOI) theory, the Technology Acceptance model and Technology Transfer model. The technology-planning framework outlines different planning functions for a district and a school.

Finally, Malapile and Keengwe (2013) discuss the requirements that need to be considered in technology planning when developing a framework, namely equity issues, stakeholders' participation, educational administration, Internet and data communication in schools, monitoring and evaluation, software evaluation and dissemination of good innovation practices. They conclude that generally, integrating the technology requires some favourable conditions and variables.

In another paper, Mirza and Al-Abdulkareem (2011) discuss the current situation of e-learning in the Middle East and present drivers and barriers to e-learning, and the different types of e-learning initiatives and steps being taken to overcome the perceived challenges. According to them, delay in the adoption of e-learning in the region is due to delays in accepting the Internet. Firstly, e-learning supports female-only universities and overcomes the problem of students being at university after school hours and on weekends. This is due to social and cultural norms such as at Zayed University in UAE. E-learning helps females to interact online with faculty members and this negates some of the problems females face in the classroom. Posting on discussion boards will help students to share their opinions and ideas, and feel comfortable in doing so.

Mirza and Al-Abdulkareem (2011) contend that e-learning helps students to overcome some barriers existing due to political problems such as those occurring in the West Bank, specifically the campuses of Al Quds University. Yet, many barriers affect adopting e-learning in the Middle East such as the low percentage of people aware of e-learning, which affects both academic and other employees' development levels. A low Internet participation rate is explained by high initial cost, quality of Internet connection, the fear of access to subversive values or information according to conservative religious clerics. Moreover, online learning is perceived as leading to less job opportunities compared to traditional degrees. Finally, Mirza and Al-Abdulkareem (2011) state that there is a lack of Arabic language materials online and the lack of faculty members' ICT skills may affect the acceptance of e-learning in the Middle East. Some programs such as computing sciences, medicine and engineering may be more applicable for e-learning in the Middle East because they are taught in English.

Khan et al. (2012) present a comprehensive review of international studies relating to barriers encountered when introducing ICT into classrooms in Bangladesh. They

identify the factors that influence teachers' decisions to implement ICT. The government of Bangladesh has experienced several barriers in the process of implementing ICT in education. The first concerns the resources and appropriate infrastructure. Many rural areas in Bangladesh simply do not have a reliable electricity supply, computers, printers, multimedia projectors, scanners and the Internet. Since Bangladesh is a poor country, substantial funding is very difficult to obtain. It is very important to have enough funds to provide a proper ICT supported hardware, software, Internet, audio visual aids, teaching aids and other accessories to effectively implement technology. Yet, technology by itself will not lead to improvements in education without a good vision and plan at the government and school levels. Governments need to develop a proper plan, policies, execution and monitoring system. Schools need to know how to integrate ICT but in Bangladesh there is no proper vision and plan in schools for ICT planning, support, and training.

Political factors constitute the fourth barrier to the implementation of ICT in education. Those in authority do not want to allocate sufficient funds for education because they want other sectors of society to be supported. In addition, social and cultural factors especially those regarding women are significant. The low social status of women in developing countries affects the provision of education to them. Men usually occupy management and technical roles and they enjoy easier access to technology. Corruption is so pervasive in developing countries and this is a major barrier to the implementation of ICT in education. While massive budgets are established to buy modern teaching and learning materials to improve the teaching and learning process, only minor improvements are the outcome. Teachers' attitudes and beliefs about teaching and learning with ICT are essential to better integration. Teachers who have positive attitudes to ICT itself will be positively disposed towards using it in the classroom and teachers with negative attitudes to computers will not.

In their paper, Khan et al. (2012) highlight teachers' lack of knowledge and skills as one of the main barriers to effective use of ICT in education for developed and developing countries. There is the universal lack of time due to shortages of teachers and administrative tasks and bureaucratic 'over-management' in developing and developed countries which causes heavy workload. Consequently, teachers do not have time to design, develop and incorporate technology into their lesson plans. They need time to learn how to use the hardware and software, time to plan, time to

collaborate with other teachers and time to develop and incorporate technology into their curriculum. Finally, Khan et al. (2012) note the other factors that directly and indirectly influence the effective implementation of ICT in education in Bangladesh. These are poor administrative support, lack of appropriate staff training and quality training for teachers and school principals, lack of qualified ICT coordinators who will assist teachers to integrate ICT in classroom and lab, and unfavourable school culture.

Haghighia and Eskandari (2012) determined the effects of different barriers on using information technology for learning and teaching in elementary school students. Firstly, their study points out that the lack of infrastructure compromises the implementation of ICT for elementary schoolchildren. This undermines teachers' awareness and ICT skills. Awareness is a very important factor as it could increase the motivation to implement ICT and improve students' learning.

Xie et al. (2014) investigated problems in colleges and universities in Guangdong in China. They found that it is important to construct and share digital educational resources such as online teaching and learning platforms. Online courses must be of high quality in the online domain. Moreover, the application and sharing of digital educational resources in and outside the campus wields a significant influence. Teachers' ICT competence training is an important part of educational and a significant guarantee of the construction and sharing of digital educational resources. It enhances the teachers' ability to develop resources and creative applications.

According to Sarkar (2012) one of the most common problems of using ICTs in education is to base choices on technological possibilities rather than educational needs. The high cost of acquiring, installing, operating, maintaining and replacing ICTs especially in developing countries is very expensive. Not all faculties are ICT literate and in developing countries basic requirements such as electricity, telephone networks and proper rooms or buildings to accommodate the technology are inadequate or non-existent. Additionally, teachers need to improve their technical and non-technical skills to efficiently make use of the different ICTs in different situations. This improvement will help them to become more confident, conversant and comfortable with technology.

Peeraer and Van Petegem (2012) analysed the technology plans of five Teacher Education Institutions (TEIs) in Vietnam and in particular the most important barriers

affecting implementation. Firstly, they show that infrastructure is very important and this means having access to computers and the Internet, a projector and a screen, a printer, a fax and a Local Area Network, software applications and a school website. Moreover, their study indicates that professional development and technical support is essential. Training does not simply include just the use of ICT for teaching practice but also refers to skills such as online searching for information. It is very important to be practical and have up-to-date training programs, and organise training for two separate groups: older lecturers and younger lecturers, and offering incentives for trainers. Finally, these authors show the importance of incorporating ICT as a subject in the curriculum to generate pedagogical and curricular change.

Buabeng-Andoh (2012) reviewed teacher-level, school-level and system-level factors that affect teachers' use of computer technology in teaching and learning processes. This study mentions that knowing the extent to which these barriers affect individuals and institutions may help decision-makers make decisions on how to tackle them. Firstly, the author shows that personal characteristics such as education level, age, gender, educational experience, experience with computers for educational purposes and attitude towards computers can influence the adoption of a technology. All of these characteristics are linked to each other. The second factor concerns institutional characteristics which help to improve teachers' existing attributes: professional development, access to ICT infrastructure and resources in schools, technical support and leadership support. An understanding of institutional characteristics that influence teachers' adoption and integration of ICT into teaching is essential to overcome these institutional level problems. Thirdly and finally, technological characteristics are significant factors impacting on adoption. This level includes many features such as teachers' time required to learn new skills, old ICT equipment, large classes, number of computers available for pupils' use, technical and pedagogical support and collaboration among teachers. These are constraints on teachers' confidence and competence in the use of ICT and innovation attributes such as relative advantage, compatibility, complexity, trialability, observability, visibility, ease of use, results demonstrability, technical support, motivation, strong leadership, etc.

Buabeng-Andoh (2012) concludes that even when institutions provide teachers with excellent ICT facilities, if teachers have negative attitudes toward technology, then this may become a pointless exercise. Therefore, teachers need to be assured that

technology can make their teaching more interesting, easier, more fun for them and their students, more motivating, and more enjoyable. Knowing the extent to which these barriers affect individuals and institutions may help to take a decision that overcomes these barriers.

Touray, Salminen, and Mursu (2013) reviewed ICT barriers in the literature published from 2000 to 2011, and identified such barriers through empirical findings from the Gambia Public Utilities and Regulatory Authority (PURA) as the host institute. They compared their findings with others in the literature and categorised these barriers as critical success factors. The barriers in both studies are grouped into eight possible critical success factors: political and leadership; socio-cultural; infrastructural; technical; educational and skills; economic, security and safety; and legal and regulatory. All these factors comprise several barriers and in total there were 43 ICT barriers in developing countries, of which 40 are common to countries while three refer to the Gambia institution.

The most important and major problems according to Touray et al. (2013) are infrastructural and economic in character. Other problems are minimal in Gambia compared to the literature such as lack of political and leadership constraints, legal and regulatory constraints and security and safety. On the other hand, the lack of Internet Exchange Points (IXPs), 'invisible hands' and micromanaging are three more barriers noted in the empirical data for Gambia and not in other studies. The lack of Internet Exchange Points is the main reason for the high cost of Internet access in Africa and developing countries. Micromanaging has emerged as a major problem in Gambia. The researchers point out that responsibility without authority is useless, and that leaders should be able take a decision and engage the right people to work with them within a reasonable budget. Finally, Gambia suffers from what the researchers refer to as 'invisible hands' whereby foreign government/investors who fund development projects in developing countries enjoy the contracts which their home companies profit from regardless of their cost.

3.3.2.3 Developed Countries

This section discusses several studies that have investigated problems affecting the implementation of ICT in education systems in countries that are currently considered "developed". The material is provided to provide both a context and a contrast to

studies that have explored similar issues in “developing” countries such as Saudi Arabia and the Gulf States.

Fabry and Higgs (1997) examine barriers that impede the effective use of technology in United States schools. They found that the most basic and significant barrier to technology integration is teachers’ resistance to change. They pointed out two types of change that teachers must make: learning how to use technology; and fundamentally changing how they teach. They also found that there are many reasons for this resistance such as fear of loss of status, fear of losing control of the classroom, fear of embarrassing acts, loss of hard-earned skills and not having adequate knowledge.

Fabry and Higgs (1997) also found that teachers’ attitudes are reflected by issues concerning innovation and adoption. According to the authors, innovators are eager to try new ideas and are at the forefront of technology use. Early adopters follow innovators and are the successful users of technology. Moreover, these authors point out that teachers must be given the time to learn new skills and experiment with technology through training, share their experiences with colleagues, and attend technology-related in-service training programs which will support them to develop the skills to make technology transformational. Moreover, Fabry and Higgs (1997) point out that even though there are approximately 5.8 million computers in schools, many teachers report little or no use of classroom computers for instruction. They mention that access to the technology in a school is more than simply the availability. They state that access to technology must be relevant and of the right type. A final issue is that ineffective access means there is inequity in computer resources in schools which causes enormous variability in student-computer ratios from school to school.

Finally, Fabry and Higgs (1997) highlight the problem of the costs of hardware, software, maintenance and repair, training and technical staffing, replacement and system upgrades, and telecommunications connections. Moreover, they point out to other costs that are shaped by school location, for example electrical power, air conditioning, ventilation, lighting and security systems. Fabry and Higgs (1997) make two recommendations: providing a strong technology plan and addressing the training issues.

Granger et al. (2002) examined factors that facilitate successful ICT implementation in four Canadian schools by analysing the data in qualitative case studies. Their study

involved only 12 schools, selected (from 60 initially nominated) by a national panel of educators, educational administrators, researchers, government representatives, and educational technology experts. Firstly, they note that one of the most important factors constitutes individual characteristics which include teacher comfort and confidence, educational backgrounds, ICT skills and experience, beliefs and goals concerning technology, and resistance to ICT. According to the authors, the second factor in this study is environmental factors which include logistics which include time and equipment, community both within schools and between the schools, and the importance of families.

Mungania (2003) explored barriers experienced by employee e-learners used quantitative methods for data collection and analysis and some open-ended questions in seven organizations in the United States and abroad. She asserted that there are 7 e-learning barrier categories that employees encounter. The first consists of personal issues such as time management problems, language problems, attitude towards e-learning and learning style or preferences. Situational barriers are the second category, which include time for study and interruption during study. Thirdly, organizational barriers comprise cultural problems concerning credibility of e-learning, lack of time for study, interpersonal barriers, limited online course availability, registration system problems, lack of awareness of available online courses and failure to involve employees in planning or decision-making.

Furthermore, Mungania (2003) stated that technological barriers are the fourth category and incorporate learning management systems (LMS) quality, connectivity problems, lack of training, navigation problems, limitations of technical support, loss of data and inability to save or transfer data. The fifth category is that referring to learning style problems. Content suitability barriers are another category and this is where learners' expectations of the course can be undermined by poor course relevance and content, material that is not audience-specific, limited rigor and poorly constructed assessments. Finally, instructional barriers refer to lack of progress reports and feedback, limited learner engagement, poor instructional design, limited reference materials, access and navigation problems, limited use of multimedia, unclear or inconsistent instructions, inability to save work, information overload, lack of instructor presence/interaction and poor coordination. Mungania (2003) concludes her report with many recommendations for future research. One important point is that

identifying barriers and solutions should be a continuous process for practitioners, because of constantly changing workplace environments, employees, course offerings, and technologies.

Petko (2008) examined factors influencing computer use in Swiss classrooms and used a survey involving 712 school administrators and 1322 teachers from all levels. He points out that in Switzerland there is a large gap between computer use at home and in school, and this situation has to be improved. The author concluded that the most important factors are better access to computers in the classroom, specific competence, and specific motivation. All three themes were further divided into several sub-categories.

Chen (2009) explored barriers to adoption of technology-mediated distance education (TMDE) in higher education institutions in the United States, using secondary data collected between 2000 and 2001. He refers to two major independent variables, these being barriers to TMDE adoption. The first factor is program cost which includes program development, equipment failure and simply maintaining the equipment. Faculty participation is the second factor which includes faculty workload, lack of faculty interest, and lack of faculty rewards or incentives.

Abrahams (2010) examined the issues and barriers that inhibit faculty personnel from using technology in instruction, and this scholar employed an exploratory and descriptive mixed method to gather information from academic faculty teachers, administrators and other staff in a single university in the United States. Barriers were identified in the process of technology adoption and diffusion theory and the literature. The author points out seven frequently recurring barriers to technology adoption: perception, resistance to change, lack of technical and financial support, poor infrastructure, poor knowledge/information, and technophobia.

Muilenburg and Berge (2005) used 1.056 surveys in their study to determine the underlying constructs that comprise American student barriers to online learning. They found eight main factors: administrative issues, social interaction, academic skills, technical skills, learner motivation, time and support for studies, cost of and access to the Internet, and technical problems. Also using a survey, Berge, Muilenburg and Haneghan (2002) pointed out the barriers to distance training and education and elicited 2,504 responses from various stakeholders in different parts of the

organization. They addressed six issues: work place (e.g., community college, government); job function (e.g., support staff, managers, researchers, students); type of delivery system used (e.g., audio-tape, computer conferencing, ITV); expertise of the individual regarding distance education; stage of the respondent's organization with regard to capabilities in delivering distance education; and the area in which the respondent primarily works (e.g., fine arts, engineering, education). The analysis of the sixty-four barriers to distance education resulted in ten factors that emerged: administrative structure, organizational change, technical expertise, social interaction and quality, faculty compensation and time, feeling threatened by technology, legal issues, evaluation/effectiveness, access, and student support services.

Haber and Mills (2008) examined the perceptions of Florida's full-time community college faculty members who teach by distance learning, with reference to the ten policy areas set out by Berge and Muilenburg (2000). Haber and Mills used focus group sessions for 701 full-time community college instructors at three community colleges. They noted key points for each policy barrier/issue at each of the three community colleges. These were as follows: administrative structures, organizational change, technical expertise, support and infrastructure, social interaction and program quality, faculty compensation and time, threat of technology, legal issues, evaluation and effectiveness, access and student support services.

Maguire (2005) reviewed many studies to examine the overall attitude of higher education faculty teachers toward teaching and factors that motivate and deter their participation in distance education. A total of thirteen articles was reviewed which used either or both of quantitative and qualitative methods. Maguire (2005) explained some barriers including lack of standards for an online course, the threat of fewer jobs, and a decline in usage of full-time faculty which faculty members believe results in a decline in quality of faculty resources, lack of time, lack of institutional support, lack of scholarly respect in the areas of promotion and tenure, and a lack of training. Furthermore Maguire (2005) pointed out that motivation and inhibition are important factors that affect faculty participation in distance education. She grouped barriers into categories, these being personal, external, technical, pedagogical, and institutional. The factors within these categories are further delineated into intrinsic motivators, extrinsic motivators, institutional motivators, intrinsic inhibitors and institutional inhibitors.

3.3.3 Summary of Barriers

This section summarises the findings of those studies that have investigated barriers to effective ICT implementation in e-government or education in countries of interest. Table 3-2 lists details of 25 such studies, with brief details of its target domain, regional context, methodology, and findings. For the 10 most commonly identified barriers, Table 3-3 provides a mapping that indicates the studies in which each barrier was identified.

Table 3-2 Summary of the barriers to using ICT

Domain	Region	Author/s & Date	Topic	Methods	Findings
E-government	Saudi Arabia and the Gulf States	Alshehri and Drew (2010)	Challenges of e-Government Services Adoption in Saudi Arabia from an e-Ready Citizen Perspective	Qualitative and quantitative	● Technical Barriers -ICT Infrastructure -Privacy, security and trust in e-Services ● Organisational Barriers -Lack of qualified personnel and training -Resistance to change to electronic ways -Lack of policy and regulation for e-usage -Lack of partnership and collaboration -Lack of programs to promote e-government benefits and advantages -Lack of strategic planning ● Social Barriers -Culture ● Leaders and Management Support ● Financial Barriers
		Omari (2013)	Technology Adoption in the Arabian Gulf Countries: The Case of E-Government	Literature review	**Challenges:** ● Infrastructure ● Policy issues ● Human development continuous learning ● Change management ● Strategy ● Cultural differences ● Ease of use ● E-Bureaucracy
	Developing Countries	Nawi, Rahman, and Ibrahim (2011)	Government's ICT Project Failure Factors: A Revisit	Qualitative	● Project Management Factors ● Top Management Factors ● Technology Factors ● Organizational Factors ● Complexity / Size Factors ● Process Factors
		Ziaie (2013)	Challenges and Issues of ICT Industry in Developing Countries	Qualitative	● Rules and legislation ● Human resources (HR) ● Technical infrastructures ● Internal politics
Education Systems	Saudi Arabia and the Gulf States	Bingimlas (2009)	Barriers to the successful integration of ICT in teaching and learning environments: A review of the literature	Literature review	● Teacher-level barriers - Lack of teacher confidence - Lack of teacher competence - Resistance to change & negative attitudes ● School-level barriers - Lack of time - Lack of effective training

Domain	Region	Author/s & Date	Topic	Methods	Findings
					- Lack of access to resources - Lack of technical support
		Alwani and Soomro (2010)	Barriers to Effective use of Information Technology in Science Education at Yanbu Kingdom of Saudi Arabia	Quantitative	● No Specific IT Budget ● Lack of Finding for Hardware ● No Electronic, Science Text Books ● Lack of English Training needed for IT ● Not enough Time in School for IT related activities ● No instructional support for incorporating IT into teaching ● No vision or Strategic plan for IT ● Science Curriculum not compatible with IT ● No access to Internet during School ● Classroom Architecture not suitable for IT
		Ahmed, Buragga, and Ramani (2011)	Security Issues Concern for E-Learning by Saudi Universities	Literature review	● E-LEARNING: SECURITY ISSUES - User Authorization and Authentication - Entry Points - Dynamic Nature - Protection against Manipulation - Confidentiality - Integrity - Availability - Non-Repudiation
		Algahtani (2011)	Evaluating the Effectiveness of the E-learning Experience in Some Universities in Saudi Arabia from Male Students'	Qualitative and quantitative	● Lack of technical support ● Instructors overloaded work ● Lack of learners training ● Lack of planning ● Lack of infrastructure ● Lack of finance ● Lack of policy ● Lack of human resources ● Lack of protection of intellectual property
		Alhazzani (2013)	Information Technology Challenges faces Higher Education Institutions from the point of view of academic and administrative leadership at King Saud University	Quantitative	● Lack of training staff ● Awareness of security issues ● English language skills ● Lack of manuals ● Lack of maintenance ● Lack of monitoring and updating systems ● Lack of good infrastructure ● Lack of understanding the complexities of managing ICT systems ● Lack of suitable policies ● Lack of private sector contribution ● Lack of material support ● Lack of finance

Domain	Region	Author/s & Date	Topic	Methods	Findings
		Alarabi (2013)	Challenges the use of e-learning with faculty members Institutes teaching Arabic to nonnative speakers in the Kingdom of Saudi Arabia.	Quantitative	● Lack of ICT resources ● Lack of motivation ● Lack of Internet connection ● Lack of training ● No strategic plans to use e-learning ● No department for producing electronic courses materials ● Lack of technical support ● Lack of leadership support ● Lack of rules and regulation for e-learning
		Al Gamdi and Samarji (2016)	Perceived Barriers towards e-Learning by Faculty Members at a Recently Established University in Saudi Arabia	Quantitative	● Poor Internet access and networking ● Lack of training on e-learning ● Lack of technical support in the university ● Inadequate availability of hardware and software ● Lack of institutional policy for e-learning ● Lack of adequate English language proficiency ● Lack of instructional design support for e-learning ● Concern about faculty workload ● Lack of incentives to use e-learning ● Lack of credit towards promotion ● Lack of time to develop e-courses ● Concern about access to students ● Concern about security issues on Internet ● No role models to follow ● Concern about the quality of e-courses ● Self-intimidated by technology
		Al Mulhim (2014)	The Barriers to the Use of ICT in Teaching in Saudi Arabia: A Review of Literature	Literature review	● Lack of Access to ICT ● Lack of Training ● Lack of Time
		Altameem (2013)	What Drives Successful E-Learning? An Empirical Investigation of the Key Technical Issues in Saudi Arabian Universities	Qualitative	● ICT infrastructure ● Security ● Access (on-site and off-site) ● IT support
		Asiri, Mahmud, Abu Bakar, and Mohd Ayub (2012)	Factors Influencing the Use of Learning Management System in Saudi Arabian Higher Education: A Theoretical Framework	Theoretical framework	● Internal Variables - Attitude - Pedagogical Beliefs toward E-learning - Competence Level in Using LMS ● External Variables - External Barriers Faced by Faculty Members - Demographic Factors

Domain	Region	Author/s & Date	Topic	Methods	Findings
		Almalki and Williams (2012)	A Strategy to Improve The Usage of ICT in The Kingdom of Saudi Arabia Primary School	Literature review	● Teacher Factor - Lack of teacher confidence - Lack of teacher competence - Negative attitudes ● School/Institution Factor - Lack of time - Lack of efficient training - Lack of local technical support - Leadership barrier ● Extrinsic Factor - Local culture - Lack of funding support - Lack of appropriate planning
	Developing Countries	Salehi and Salehi (2012)	Challenges for Using ICT in Education: Teachers' Insights	Quantitative	● Shortage of class time ● Little access to ICT ● Few ICT technical supports at schools ● Society views about ICT ● Time needed to learn using ICT ● Requirements of qualifications
		Malapile and Keengwe (2013)	Information Communication Technology planning in developing countries	Diffusion of innovation theory	**Challenges:** ● Lack of diffusion of technology ● Low income levels ● Lack of financial sustainability plans ● Lack of electricity ● Lack of classrooms suitable for computers ● Poor planning and infrastructure ● Poor education systems ● Socio-political conditions ● Lack of governmental vision & leadership
		Mirza and Al-Abdulkareem (2011)	Models of e-learning adopted in the Middle East	Literature review	**Challenges:** ● Accepting the Internet -High initial cost -Quality of Internet connection -Fear of access to information according to conservative religious clerics ● Social and cultural norms ● Political problems ● Lack of Arabic language materials online ● Lack of faculty members' ICT skills
		Khan, Hasan, and Clement (2012)	Barriers to the Introduction of ICT into Education in Developing Countries: The Example of Bangladesh	Literature review	● ICT Supported Infrastructure ● Lack of Resources & infrastructure ● Insufficient Funds ● Vision and Plan - Government vision and plan -School Vision and plan ● Political Factors ● Social and Cultural Factors ● Corruption ● Teachers' Attitudes and Beliefs about ICT ● Lack of Knowledge and Skill ● Lack of Time

Domain	Region	Author/s & Date	Topic	Methods	Findings
		Haghighia and Eskandari (2012)	A study on barriers of using information technology on learning and teaching in elementary schools	Quantitative	● Lack of infrastructure ● Teachers' awareness ● ICT skills
		Xie, Yin, Chang, Wu, and Ni (2014)	Current Status and Solutions Towards the Construction and Sharing of Digital Educational Resources in Colleges and Universities: A Survey from GuangDong in China	Qualitative and quantitative	● The construction of digital educational resources - Online teaching and learning platform - Digital instructional resources platform ● The application and sharing of digital educational resources - Application within campus - Sharing and application outside campus ● The teachers' training for ICT competence ● Problems - The mechanism on construction and sharing of digital educational resources should be more improved. - The form of digitized resources should be more innovative. - The system of resources sharing should be more open to public. - The teacher training services should be more completed.
		Sarkar (2012)	The Role of Information and Communication Technology (ICT) in Higher Education for the 21st Century	Literature review	● High cost of acquiring, installing, operating, maintaining and replacing ICTs ● Basic requirement of electricity and telephone networks is not available ● Teachers need to develop their own capacity
		Peeraer and Van Petegem (2012)	Information and communication technology in teacher education in Vietnam: from policy to practice	Quantitative	● TEIs vision on added value of ICT ● Baseline situation and operational planning - Infrastructure and content development - Professional development and technical support - Pedagogical and curricular change
		Buabeng-Andoh (2012)	Factors influencing teachers' adoption and integration of information and communication technology into teaching: A review of the literature	Literature review	● Personal Characteristics - Teachers' attitudes - ICT Competence - Computer self-efficacy - Gender - Teaching Experience - Teacher workload ● Institutional characteristics - Professional development - Accessibility - Technical support - Leadership support ● Technological Characteristics

Domain	Region	Author/s & Date	Topic	Methods	Findings
		Touray, Salminen, and Mursu (2013)	ICT Barriers and Critical Success Factors in Developing Countries	Qualitative and quantitative	● Lack of Internet Exchange Points (IXPs) ● Micromanaging ● Invisible hands

Table 3-3 The 10 most common barriers to effectively using ICT

	ICT Infrastructure	Policy	Technical support	Training	Attitude	Skills	Time	Finance	Security	Planning
Alshehri and Drew (2010)	✓	✓		✓	✓			✓	✓	✓
Omari (2013)	✓	✓								
Nawi, Rahman, and Ibrahim (2011)	✓									
Ziaie (2013)	✓	✓								
Bingimlas (2009)	✓		✓	✓	✓		✓			
Alwani and Soomro (2010)	✓		✓	✓			✓	✓		
Ahmed, Buragga, and Ramani (2011)									✓	
Algahtani (2011)	✓	✓	✓	✓			✓	✓		
Alhazzani (2013)	✓	✓		✓		✓		✓	✓	
Alarabi (2013)	✓	✓	✓	✓						✓
Al Gamdi and Samarji (2016)	✓	✓	✓	✓			✓		✓	
Al Mulhim (2014)	✓			✓			✓			
Altameem (2013)	✓		✓						✓	
Asiri, Mahmud, Abu Bakar, and Mohd Ayub (2012)					✓					
Almalki and Williams (2012)			✓	✓	✓		✓	✓		✓
Salehi and Salehi (2012)	✓		✓				✓			
Malapile and Keengwe (2013)	✓	✓						✓		✓
Mirza and Al-Abdulkareem (2011)	✓	✓				✓				
Khan, Hasan, and Clement (2012)	✓	✓			✓	✓	✓	✓		✓
Haghighia and Eskandari (2012)	✓					✓				
Xie, Yin, Chang, Wu, and Ni (2014)	✓			✓						✓
Sarkar (2012)						✓		✓		
Peeraer and Van Petegem (2012)	✓		✓							✓
Buabeng-Andoh (2012)	✓		✓		✓	✓	✓			
Touray, Salminen, and Mursu (2013)	✓									

3.4 Strategic Solutions for ICT Implementation

Garg et al. (2011) discuss various aspects of implementation of e-governance in technical and vocational education institutions in India. This study points out that e-governance for the technical education sector must be implemented at two levels. Firstly, the central/national level is responsible for planning and implementing, policies, regulating and ensuring quality in technical colleges. Secondly, education

institute level has to apply and implement all central government responsibilities. They suggest that eight steps must be enacted to establish an effective e-government system, including ensuring management's commitment is to establish an e-government program within the total budget, and establishing a core committee to implement e-government that consist of representatives from each department and is integrated under the e-governance program.

For its effective implementation, an awareness of the e-governance program will have to be created among all the stakeholders through meetings, workshops, training programs and publicity materials such as awareness booklets, pamphlets, etc. Implementation phases have to be developed and this means assessing the hardware and software needs for the institution. Maintenance and continuous improvement after full implementation is very important and must be executed. Finally, e-government systems must be integrated with the central/national e-government system so that the maximum benefits can be enjoyed. Academic standards at the central level need to be continuously monitored and assessed, as should be that of the students, so that all stakeholders understand what is happening in terms of ICT implementation.

Ziaie (2013) looks at different aspects of ICT-related issues based on interviews with activists, decision makers, and experts in the field of ICT in Iran and a literature review. Before any measures or solutions are suggested, there are two prerequisites that should be met. Firstly, a change in the mentality of the highest authorities and leaders to understand that ICT will not be deemed a threat to the existence of their regimes. Secondly, it is very important to foster a safe and sound environment for investors and business people, and to have an unbiased judiciary system. Social and cultural realities should not be ignored, otherwise the introduced technologies or features will either be ignored, or employed in a harmful or inefficient way.

Ziaie (2013) highlights five possible solutions to tackle problems inherent in ICT implementation. First, new technologies and systems demand new regulations and this can be done by adapting laws and policies already used in developed countries. Decision-makers and law enforcement agencies should have a general understanding of ICT and the proper curriculum rules and legal basis for introducing ICT-related courses, or additional training programs. The second solution concerns human resources and this means providing attractive conditions to prevent the threat of 'brain

drain' occurring in many developing countries. Training and education experts on online programs or hiring foreign specialists should also be considered. Restructuring old curricula that are used in schools and universities, and facilitating exchange programs and agreements with developed countries will improve how human resources are allocated.

The third solution is to invest in communications and other technical infrastructure to improve technical infrastructure, and this can be done by the private sector. Accessing open source products helps countries resolve patent-related issues. Sensible policies and strategies especially in the domains of e-commerce and e-government at the national level are needed as a solution. Developing a framework consisting of guidelines, instructions and recommended standards is necessary to overcome the inevitable sporadic and ad-hoc behaviour which results in inconsistencies and misalignments of education policy with reference to ICT. Electronic content generation should be made available on the Internet for the purposes of information transparency, knowledge distribution, and encouraging a culture for creating and sharing information.

Devi et al. (2014) posit that cloud technology in higher education will help solve ICT infrastructure problems. Continuous developments in ICT infrastructure and upgrades in hardware and software have implications for rising education budgets. Their study emphasises the benefits of using cloud computing to reduce costs, improve flexibility and scalability of service, availability and quality of service, support teaching and learning, reduce maintenance costs and resource costs, and increase ease of implementation.

In another study, Almalki and Williams (2012) propose several strategies and recommendations to integrate ICT at the school and national levels. It is, firstly, important to promote the personal development for teachers. The competence and self-assurance of teachers will help them to incorporate technology in their teaching processes. Almalki and Williams (2012) document several personal development strategies for teachers such as training and attendance at workshops to increase their knowledge and use of ICT. Students and especially those from low income families should receive basic training in ICT as part of their studies.

Support from the institution/school is the third solution and this refers to encouragement to use ICT, training, well maintained ICT components, hardware, well planned timetables, improved curriculum, providing appropriate resources and technical support staff, monitoring, etc. The fourth solution suggested by Almalki and Williams (2012) is for governments to support ICT access financing needs, and in particular to pay for the provision of appropriate software and hardware to schools. Successful adoption of ICT strategies will occur when cultural problems are resolved. For example, the government should have a policy/legislation in place to control cultural conflicts regarding Internet access by controlling and standardising content and blocking websites.

With reference to Saudi Arabia, Almalki and Williams (2012) make several recommendations based on what other countries have done. Saudi Arabia needs to create a suitable ICT infrastructure environment consisting of the right hardware, software, professionals who install and use them, particularly in terms of communications technology such as the Internet. This will require a huge amount of funding and will mean changes to the culture. Also, Almalki and Williams (2012) assert that the Ministry of Education should develop, manage and control ICT integration through competent, experienced and highly trained staff and ensure that it is sustainable. Finally, the Ministry of Education should develop and implement ICT training programs for teachers so that they have more confidence and expertise in using ICT and improve their students' learning.

3.5 Summary

In summary, this chapter locates the current study within the relevant academic literature to address the questions developed for this study. Here the most important barriers that lead to avoiding the use of ICT in Saudi Arabia's universities and how can they can be overcome, were investigated. This chapter started by defining the concept of ICT. After that, the impact and influence of ICT in the education system and especially tertiary education was discussed. Then, this chapter discussed the most important barriers facing governments and their education systems in developing countries and Saudi Arabia. Finally, this chapter outlined the most important strategic solutions that should be implemented, according to the findings of various studies.

Many of the studies reviewed include data from Saudi Arabia or from one or more of the Gulf States. However, the review did not find any that explicitly address the difference between Saudi Arabian and Gulf-State data, and how those differences affect ICT use. Although the cultural and economic environments in these countries are similar, effective implementation of education ICT systems in Saudi Arabia lags that in other Gulf State countries. The research described in this thesis was motivated by the belief that an understanding of these differences would help identify strategies to enable Saudi universities to catch up, although very little work has previously been done in this area.

CHAPTER 4 BARRIERS AND CHALLENGES

4.1 Introduction

Firstly, this chapter presents the methodology that has been employed with an explanation of the design and methods for identifying and describing the ICT problems that students, faculty members and staff of Saudi Arabian universities encounter. Data in this phase were collected via a quantitative and qualitative approach. This section consequently discusses the methodology and its applications, and draws attention to the following main themes: research questions; data collection procedures; and data analysis.

After that, the chapter presents the results obtained from the data collected in this phase of the research, which investigated the barriers to employing ICT in university effectively. The findings in this phase are drawn from the questionnaire responses of different participant groups.

The final section discusses findings of the results, highlighting the most significant and important results. The results are divided into 4 sub sections, each focussing on a key barrier or challenge which affects implementing ICT in Saudi Arabia.

4.2 Process and Methodology

This section overviews the process and methodology used in this phase of the research and describes the research questions and data collection, identifying the qualitative data, quantitative data, sample selection and survey development, data collection procedures and data analysis procedures.

4.2.1 Research Questions

In order to investigate the interconnected problems or barriers that affect students, faculty members and staff when using ICT in Saudi Arabia's universities, the following research questions were identified:

Q 1.1: Why is ICT not used in Saudi Arabian universities to the same extent as it is in universities in developed countries, or even in neighbouring Gulf States such as Oman, Qatar, United Arab Emirates and Bahrain?

Q 1.2: What are the most important barriers that might affect the adoption of information and communication technology in Saudi Arabian universities?

Q 1.3: Is there a difference between Saudi Arabian universities and universities in Gulf States in terms of faculty, students and staff in relation to

- Their attitudes toward ICT?
- The barriers they have encountered?
- Their experience with technologies?

4.2.2 Data Collection

The term mixed method, according to Mertens (2014), is the use of both quantitative and qualitative methods to answer a research question. A brief overview about the mixed method used in this phase through a questionnaire will be presented. This section will also highlight the tool employed in the study: the questionnaires with reference to barriers that discourage effective ICT use in Saudi Arabia's universities. The pilot study, population and the sample, with its characteristics, will be explained.

4.2.2.1 Quantitative Data Collection

Questionnaires represent an efficient strategy for collecting data from a wide range of people in a relatively short period of time (Creswell, 2013; Gillham, 2000; Teddlie & Tashakkori, 2009; Wilkinson & Birmingham, 2003). A carefully constructed questionnaire can alleviate the problems posed by bias, whilst the anonymity of written questionnaires may elicit more truthful or realistic responses (Gillham, 2000; Wilkinson & Birmingham, 2003). Furthermore, quantitative data is subject to statistical analysis which is generally time-efficient (Johnson & Christensen, 2013). Noting the flexibility of the survey instrument, Johnson and Christensen (2013) state that questionnaires are not limited to a single research method. They can in fact be employed in a mixed method design where participants self-report their beliefs, opinions, attitudes, perceptions and feelings of a topic under analysis. This type of data collection is enhanced by gathering participants' demographic information (Creswell, 2014).

This procedure has a number of advantages such as ease of application, reduced bias and the ability to standardise and compare responses. Questionnaires can negate the difficulty posed by interviewing many respondents face-to-face and which take time

to organise and set up. Questionnaires also have the advantage of providing sufficient time for respondents to think about their answers, which enhances their accuracy. Consequently there is arguably a greater degree of validity and scope for less bias because the researcher is absent. Questionnaires make it possible to standardise and harmonise data and facilitate the compilation, tabulation and reporting of results that are often accurate and stable. Subsequently this procedure has proved to be widely popular in terms of time, effort and money required (Gay & Mills, 2015; Louis, Lawrence, & Keith, 2007; Oppenheim, 2000).

4.2.2.2 Qualitative Data Collection

The qualitative method emphasises the interpretation of certain phenomena, seeing research as a situated activity that turns the world into a series of representations, including field notes, interviews, conversations, photographs, recording, and memos, This type of research involves an interpretive, naturalistic approach to its subject matter (Mertens, 2014). Denzin and Lincoln (2011) find qualitative research unproblematic, saying it involves personal experiences, life stories, interviews, etc. Whether it is seen as symbolic or not, qualitative research captures holistic pictures using words. It is the collection of data through the use of qualitative instruments such as interviews, focusing on verbal description, observation and the study of documents. Its validity arises from procedures rather than the sample, which is often small. The data is collected through the interaction between the investigator and respondents. Moreover, the contextual analysis of the data leads to specific conclusions. Because this method is not so much designed for generalisation as it is to reveal in-depth experience of the phenomena under study, the results may not be typical of the whole population that the sample represents (Bryman, 2015).

From the previous definitions it is clear that qualitative research is most useful for description and obtaining a deeper understanding of phenomena. It leads to the analysis and interpretation of various phenomena and can answer the questions: how and why? It takes account of the views, opinions and experiences of humanity. It provides subjective data instead of objective data. It is based on a holistic and comprehensive understanding of the subject, and it is an inductive method. On the other hand, the quantitative method is typically focused on experimentation and the disclosure of the causes and results through numerical or statistical data. Taking account of a number of variables, quantitative research has a deductive style (Bell,

2000; Guba & Lincoln, 1994). In this phase, the qualitative method was used for the optional open-ended question that concluded the questionnaire. In both cases, one of the consequences of voluntary completion of this extra inquiry was the significant reduction of the sample size in comparison with the number of respondents who completed the Likert scale section of the questionnaire.

4.2.2.3 Sample Selection

To study any problem, the population must be identified. It is important to find out its size. Burns (2000) defines population as a complete set of all those things (people, numbers, societies, bacteria, etc.) that completely satisfies some specifications, or the total number of potential units for an observation. Marshall and Rossman (2014) have suggested that selecting the target population is critical with reference to what is being investigated in the current environment. The population in this study was conducted in four different groups of universities. The first group of universities is the main group consisting of Saudi Arabian universities. The study was limited to ten universities in Saudi Arabia. The second group of universities are the Gulf States institutions which include one university each in Oman, Qatar, UAE and two universities in Bahrain. The third group of universities is a Muslim university in Malaysia. The fourth and last group is a developed country and comprises one university in Australia.

The four groups of universities were selected for the study because:

- It is very important to understand the differences in how ICT is implemented in different universities around the world.
- For comparative purposes, the first and second groups of universities were selected because of their similarities in terms of culture, religion, infrastructure and specialty.
- A Malaysian university was selected to understand the experiences of an Asian Muslim country that is also an economically developing country.
- An Australian university was selected to learn from its experiences as a developed country.

The universities in the first group (group of Saudi Arabian universities) were selected as having differences in terms of culture, region, infrastructure and specialty, and are discussed in detail in subsequent paragraphs. For the second group (the Gulf States) I chose Dhofar University in Oman which is situated in Salalah city - the second biggest

city in that country. It is a new university and with modern infrastructure. For Bahrain I chose Royal University which is specifically for women. It is a new university and has new infrastructure. The other university chosen in this country is Kingdom University. For Qatar I chose Qatar University because it has good infrastructure and is a public university and it is the first, largest and most prominent higher education institution in Qatar. The last university in the Gulf States selected was Ittihad University which is in United Arab Emirates. It is located in Ras Al-Khaimah which is about 100 km from Dubai - the most important and famous city in the Middle East and about 250 km from the capital city, Abu Dhabi. For the third group (an Islamic culture but in a different country) the university chosen was International Islamic University Malaysia in the capital of Malaysia, Kuala Lumpur. It has different campuses and well developed infrastructure. Finally, for the fourth group (a developed country) I chose Flinders University of South Australia, located in southern Adelaide, to explore the current situation of ICT implementation in Australia. It has several campuses in different parts of Adelaide.

In Saudi Arabia, I chose Qassim University which is in the central region and it comprises more than one campus and each of them is different in some way. The main campus is situated in an area known as Al-Molida in the medium-sized city of Arras. I chose two campuses in this study and these are about 80 km from the main campus: science and arts colleges and the girls' college in Arrass. The second university I selected was Shaqra University which is located in the city of Shaqra in the central region of the country. It is a new university and it has new infrastructure currently being built. I chose three campuses in this study: Shaqra community college; the college of sciences and humanities in Aldawadmi; and college of education in Aldawadmi, which is south west and 120 km from the main campus at Shaqra. The third university in Saudi Arabia was Majmaah University which is located in the central part of Saudi Arabia in the city of Almajmaah. This university has been established with new infrastructure.

Prince Sattam bin Abdulaziz University (Al Kharj University) is the fourth university chosen for this study and it is located in the city of Al Kharj in the central region of Saudi Arabia. It is 80 km from the capital of Saudi Arabia, Riyadh. This university is a new university as well but it is different from the other new universities because it is a union of King Saud University and Imam Mohammed Bin Saud University. The fifth

university is Umm Al-Qura University which is an old institution and consists of old infrastructure which is currently being upgraded. It is located in the most important religious city in the Islamic world - Mecca (Makkah) in the western part of Saudi Arabia. The sixth university I chose was Islamic University which is an old university and has old infrastructure that is also being upgraded. It is located in the city of Medina (Almadinah Almunawarah) in the western region of Saudi Arabia and this city is the second most important religious site in the Islamic world. This university teaches Islamic education and many other subjects such as applied sciences and formal sciences. The seventh university was King Abdulaziz University which is an old university and has many campuses. It is located in one of the most important cities in Saudi Arabia which is Jeddah in the western region. It has old infrastructure that is being redeveloped for new campuses and buildings to expand this university to most of Jeddah. Taif University is the eighth university and it is situated in the western region in Taif city and some campuses do not have good infrastructure. It is a new university and has different campuses that are far from the main campus approximately 370 km.

The University of Tabuk was the ninth university chosen and it is situated in the north of Saudi Arabia. It is one of the newest universities and one of three established in this part of the country. All of these universities are new and do not have a main campus because all of their campuses and colleges under currently under construction. It has many colleges in various cities in the north region. The tenth university chosen was King Khalid University and it is a new university that combines King Saud University south campus and Imam Muhammad Ibn Saud Islamic University south campus. It is located in the southern region of Saudi Arabia.

From this group of universities a sample was to be drawn. Burns (2000) defines the sample as any part of population regardless of whether it is representative or not and Mertens (2014) refers to it as the method used to select a given number of people or things from the population. Sample is defined as a part that is representative of a large population and that shares its relevant characteristics. It is difficult to select properly from a large research population, because of limitations in surveying its members in a comprehensive manner. A certain number of them can be selected in accordance with certain principles and criteria established, the most important of which is homogeneity or similarity between the members of the sample and the remaining population. This

one factor will help clarity the results and the credibility of the study. Note that this homogeneity is not total but proportional. The importance of selecting the sample is equal to the importance of selecting the methodology (Louis et al., 2007). However, it remains true that the representation of the population using a sample is not without dispute (Wellington, 2015).

How to determine the optimal size of the sample is also a controversy among researchers. Different ratios for the size of the sample to the population offer confidence levels (Obaidat, 2003). In addition, the size of the sample is dictated by several factors such as the nature of the research topic, its importance and its objectives, and the social, political and economic context of the research. There is no fixed rule to standardise the sample size, but it is known that a large sample size helps to reduce sample errors in the selection process and its representation will be more accurate. It is accepted that larger samples produce smaller errors and the opposite is also to be expected (Keslinger & Lee, 1999).

Although the related literature mentioned many ways to create a sample, the most important ones are random samples that are simple, systematic, stratified and clustered in character. Others are non-random samples including purposive and accidental samples. For the present study, random sampling was chosen by numerical selection from a large field entailing equal opportunities for all members of the population to be chosen, which gave the best chance to get an unbiased sample. However, the technique sometimes produces some errors such as the difference between the sample mean and the population mean. Such errors can be overcome by increasing the size of the sample. As well as such a bias arising from inappropriate selection of the sample type, errors can appear when the researcher is unable to reach the sought out sample so a change is made in an attempt to process any sample. The result of this error is misleading, making the sample unrepresentative of the population (Burns, 2000; Obaidat, 2003).

The proposed size of the sample was fifty students from each university campus that was visited. Also, the sample for faculty members was twenty and administrative staff was fifteen for each university campus. However the number of returns from each sample differed between the universities as shown in Table 4-1.

Table 4-1 The number of questionnaires suitable for use

Country	University Name	Campus city	Student		Faculty members		Staff	
			Sample	Returned	Sample	Returned	Sample	Returned
United Arab Emirates	Ittihad University	Ras Al-Khaimah	50	30	20	11	15	6
Qatar	Qatar University	Doha	50	20	20	4	15	6
Bahrain	Royal University for woman	Riffa	50	17	20	0	15	1
	Kingdom University	Riffa	50	23	20	8	15	7
Saudi Arabia	Shaqra University	Shaqra	50	25	20	8	15	5
		Dawadmi	50	30	20	7	15	7
		Dawadmi	50	24	20	7	15	6
	Sattam bin Abdulaziz University	Al Kharj	50	39	20	7	15	10
	Umm Al-Qura University	Makkah	50	40	20	7	15	6
	Tabuk University	Tabuk	50	30	20	11	15	5
	Islamic University	Medina	50	37	20	12	15	13
	King Abdulaziz University	Jeddah	50	37	20	14	15	7
	King Khalid University	Abha	50	13	20	12	15	0
	Taif University	Taif	50	40	20	0	15	9
	Majmaah University	Majmaah	50	31	20	10	15	10
	Qassim University	Arrass	50	22	20	7	15	11
		Arrass	50	20	20	5	15	6
Oman	Dhofar University	Salalah	50	33	20	12	15	6
Australia	Flinders University	Adelaide	50	19	0	0	0	0
Malaysia	International Islamic University Malaysia	Kuala Lumpur	50	6	0	0	0	0
Total		20		536		142		121

Having chosen these institutions, I started organising the data collection 6 months beforehand and sought permission to do this. I sent emails to many universities in the Gulf States and Saudi Arabia to obtain their initial permission to visit their institutions. I first had to obtain ethical approval to do a survey, which took more than two months for the Social & Behavioural Research Ethics Committee to grant. Once permission was received, I sent letters to these universities from my supervisor and sponsor to help me collect data (Appendix L, Appendix M). I had to obtain approval from my sponsor which took more than 3 months to finalise. The data were collected between December 2013 and February 2014.

4.2.2.4 Questionnaire Development

A questionnaire template (Appendices B-G) was devised in line with the guidelines recommended by Ormrod and Leedy (2015): firstly, using clear and unambiguous language; secondly, meeting the research aims; thirdly, planning development, sample, distribution and collection; and fourthly, creating a clear cover letter.

A draft questionnaire was prepared and the features considered were questions, the desired format for responses and the structure and layout of the questionnaire. Simple English was used and an Arabic version was developed for non-English-speaking people. Participants could choose between the English and Arabic versions. A short,

simple and informative cover letter (Appendices I and J) was created to inform participants of the aims and importance of this research. The letter emphasised the privacy and confidentiality measures put in place for this research. The questionnaire was prepared in three versions - one for teachers, one for staff and the other one for students - on the basis of what was concluded in the literature review. The final questionnaires each had five main sections. Table 4-2 below summarises the sub-questions and places a factor number against the number of items included in the questionnaire for responses to each sub-question for each survey.

Table 4-2 Content of questionnaire for each participant group

Section name	No. of questions		
	Students	Faculty members	Staff
Information about participants' Electronic Devices & Internet Connection	8	8	8
Information about participants' University's Devices & Internet Connection	5	6	6
Information about participants' Computer Skills	3	5	5
Information about participants' Opinion	9	13	10
Personal Information	5	6	4

Each questionnaire contained two types of questions: firstly, closed questions such as yes or no questions, questions with one specific answer, and multiple choice and Likert scale questions; and secondly, open-ended questions. The Likert scale is commonly employed for conducting research (Bryman, 2015). Its multiple items measure a set of attitudes concerning a specific area where the aim is to measure general feelings or opinions on an issue. Formats for the Likert scale typically range from 1 to 3 points up to a maximum of 1 to 9 points with a middle point of neither agree nor disagree (i.e. neutral). The most common method uses scales of 1 to 5 or 1 to 7 points, ranging from strongly agree to strongly disagree. Each participant reply is called the score (Bryman, 2015). Regarding open-ended questions Coolican (2014) explained that they have many advantages, including participants being able to answer in their own way without adhering to a fixed choice answer. Open-ended questions generate richer data and more realistic answers as participants can give an explanation and reasons for why they agree or disagree.

The faculty members and staff questionnaires consisted of 33 questions while the student questionnaire consisted of 30. These were developed after reviewing a large number of recent surveys regarding user perceptions and satisfaction with ICT, Information System (IS) and e-learning fields (Al-Alwani, 2005; Vaden, 2007;

Dahlstrom, et al., 2011; OECS, 2011). Many of these surveys focus on educational systems or e-government; some investigate similar goals to this thesis and others have more general scope in ICT or e-learning. Following the review, questions relevant to the research questions for this thesis were selected and where necessary the wording modified to be suitable to the research topic and the target participants.

The first part of the survey has closed questions on the theme of Participants' Electronic Devices & Internet Connection. The second part of the survey asked questions about Participants' University Electronic Devices & Internet Connection. The third part asked questions about Participants' Computer Skills. The survey's fourth part asked questions about Participants' Opinions. These sections have asked an open-ended question by inviting respondents to add anything that was not mentioned in the questionnaire. The final section of the survey's closed questions concerned demographic information.

The research designs used were descriptive, comparative, and correlative in character. Both male and female faculty members, staff and students at the universities were asked about their use of ICT. Comparisons of their survey responses were made. The relationships between demographic information and computer experience reflecting people's attitudes to computers were also determined. The study examined and identified the barriers or problems that hinder the inclusion of ICT in learning and teaching in Saudi Arabian universities.

4.2.3 Data Collection Procedures

Participants from Flinders University and International Islamic University Malaysia were asked to complete electronic surveys which were designed using the Survey Monkey website (Appendix W) because it is very easy for these respondents to access the survey online. For other participants a paper-and-pencil survey was utilised because they are new universities with incomplete technology and infrastructure and therefore not as advanced as in Australian and Malaysian universities.

The respondents were informed about the nature of the study and how the data would be collected by means of Information Sheet for participants (Appendices I and J). They were also informed that participation in the study was voluntary and they have would the right to withdraw their consent at any time, and that the responses would remain anonymous and the data collected would be used for research purposes only.

These assurances were designed to help to make participants more comfortable when responding to the survey items. Both Arabic and English versions of the survey were distributed because the target population for this study included participants who do not speak Arabic as a first language.

4.2.3.1 Human Subjects' Committee Approval

A request to conduct this study was submitted to the Social & Behavioural Research Ethics Committee at Flinders University. The project application was reviewed and approval was granted on 3 August 2013 to begin collecting research data (Appendix H).

It should be noted that this study followed the model of social research and the ethical guidelines that are typical of educational research (Hall & Hall, 2004; Louis et al., 2007). The researcher gained official permission from all universities which meant they both approved the methodology once it was adopted by their respective ethics advisory committee.

4.2.3.2 Research Field Study Approval

In field work it is critical to obtain formal permission to contact respondents. Thus the cooperation of staff, instructors, and respondents is needed to guarantee the distribution and ensure the largest number of questionnaire answers is returned (Louis et al., 2007). Permission was requested from Qassim University to conduct the study. This required several processes which had to be completed via the Saudi Arabian Cultural Mission (SACM). The researcher sent all the required documents to SACM including a copy of the research survey, letter of support from the academic advisor, and other related documents. The SACM then sent all documents to Qassim University. The documents were reviewed there by the Graduation Studies and Academic department and approval was issued to conduct the research study. Finally, Qassim University sent an approval letter to SACM to inform me when my field study could commence.

4.2.3.3 Translation from English into Arabic

After the proposal and the instrument were approved, the researcher started the translation process. Because most participants in this study are native Arabic speakers, the researcher translated the English version of the survey into Arabic and sought feedback from a panel of experts. This procedure required many stages. Initially, after

the supervisor's approval the survey questionnaire was translated firstly by the researcher and another PhD student at Flinders University who specialises in Information Technology, and is bilingual in Arabic and English.

With the survey questionnaire translated into Arabic, this version was given to two specialists in both Arabic and English. The first individual specialises in English linguistics and the other individual in English literature. Both were asked to check the survey questionnaire's Arabic version based on the English version. There were no significant differences between the two versions. The final draft of the Arabic version was given to 10 native Arabic speakers who were asked to read the items carefully and to comment on their clarity. They made suggestions to improve the survey and the researcher modified the survey based on them. The final draft of the Arabic survey was reviewed again by a bilingual Arabic-English teacher specialising in teaching English as a second language in order to confirm the translation. He stated that the survey language was clear and understandable.

To ensure the largest number of participants, the researcher translated a cover letter for enclosure with the questionnaire, highlighting the subject of research and the method of answering the questions, and asking respondents to cooperate by replying quickly. The letter also explained how to return the questionnaire to the researcher, as well as assurance that the answers would be strictly confidential and only used for research purposes. Respondents were thanked in advance for their cooperation. Louis et al. (2007) asserted the purpose of the covering letter was to indicate the aim of the survey, to convey to respondents its importance, assure them of confidentiality, and to encourage their replies.

4.2.3.4 Questionnaire Validation and Reliability

Validity and reliability are very important in data collection instruments (Bryman, 2015; Johnson & Christensen, 2013; Mertens, 2014). Validation is required as evidence that the instrument measures what it is designed to measure, while reliability refers to a reasonable assumption that the data collection instrument will produce similar data if conducted on similar participants in equivalent conditions (Mertens, 2014). According to Bryman (2015) peer review is necessary as evidence that an instrument's content and style are valid.

There is more than one type of validity and in this study, the researcher adopted face-validity and content-validity. Face validity was addressed as follows: presenting the questionnaire to a proof-reader to provide clarity; presenting the questionnaire to other doctoral students in the department at Flinders University for discussion; presenting the questionnaire in its draft or initial stages to the supervisor; and presenting it to specialists and experts in the field of study and research. Three Saudi Arabian PhD candidate students at Flinders University who are fluent English speakers were asked to read and comment on the questionnaires. Based on their comments, some statements were modified. They provided suggestions to improve the clarity of certain items. The questionnaires were also presented to the Flinders University's research statistician to evaluate and help choose the correct measurement (Gay & Mills, 2015; Louis et al., 2007; Oppenheim, 2000).

Content-validity was addressed by testing for internal consistency with respect to usefulness, learning, interactions, and obstacles (Johnson & Christensen, 2013). Cronbach's Alpha, which is a measure of internal consistency, was computed for the respondent's responses and indicated that the data are reliable.

Cronbach's Alpha is a measure of internal consistency where items relate to and measure a given element.; a high value of Alpha (>0.7) is accepted for internal reliability (Bryman, 2015; Pallant, 2016). In this study, Cronbach's Alpha served to test the internal consistency of the four scales with good reliability. Table 4-3 summarises the overall values of Cronbach's Alpha for all questions. The results of 0.929 for students, 0.896 for faculty members and 0.916 for administrative staff show high reliability for collected questionnaires of participants.

Table 4-3 Reliability of the survey for student, faculty member and staff

Cronbach's Alpha					
Students	Items	Faculty members	Items	staff	Items
0.929	78	0.896	110	0.916	91

Table 4-4 shows the Cronbach's Alpha for all variables considered in the survey. The results confirm that the questionnaire in this study is reliable, with most results above 0.7. These results indicate that the reliability for most questions is acceptable or better, as according to George and Mallery (2011), >0.9 is excellent, >0.8 is good, >0.7 is acceptable, >0.6 is questionable, >0.5 is poor and <0.5 is unacceptable. According to

Hair, Black, Babin, and Anderson (2010), the minimally accepted value of the item-total correlation is 0.3.

Table 4-4 Cronbach's Alpha reliability coefficient analysis for each factor

Factors	Cronbach's Alpha					
	Students	Items	Faculty members	Items	staff	Items
Frequency of use of computer and Internet	0.736	6	0.498	6	0.501	6
Items affecting use of computer and Internet	0.830	10	0.845	10	0.832	10
Computer devices and Internet in university	0.591	7	0.394	7	0.499	7
Internet in university	0.908	2	0.879	2	0.870	2
Educational services	0.852	5	0.809	5		
Communication services	0.797	4	0.675	4	0.607	4
Administrative services	0.784	6	0.723	8	0.763	5
Effectiveness of services	0.879	3	0.887	3	0.801	2
Policies and guidelines for using ICT in university			0.899	4	0.885	4
ICT skills	0.912	12	0.910	12	0.909	12
Training course availability			0.870	3	0.907	3
Statements about ICT training course			0.922	5	0.897	5
Ways of obtaining ICT skills	0.822	7	0.612	6	0.628	6
Effectiveness of ICT (studding, teaching, working)	0.840	6	0.917	7	0.902	5
Barriers effecting use of ICT in teaching, working			0.914	8	0.853	8
Solutions for increasing ICT use at home	0.872	8	0.908	8	0.871	8
Solutions for increasing ICT use at university	0.882	8	0.930	9	0.872	9
Solutions for students to increase ICT use at university			0.885	8		

4.2.3.5 Pilot Study

Doing pilot studies has been recommended by several scholars (Wellington, 2015). In particular, according to Bell (2000):

> "All data-gathering should be piloted to check that all questions and instructions are clear and to enable you to remove any items which don't yield usable data".

The purpose of the pilot study is to ensure the selected format for the study is proper before proceeding to implement the main instrument. Pilot studies generally offer tests of the validity and reliability of instruments to ensure their suitability for use by the sample, and to discover if any adjustments need to be made to the tool, for example predicting adequate time for respondents to answer the items. Carrying out such a pilot study for this thesis gave the researcher confidence in the tool, allowing time to reduce errors and produce a concise questionnaire. This pilot study was done on a small number of respondents (25) randomly selected from Flinders University and International Islamic University Malaysia. The time for completing the form was found to be appropriate and it was considered that 15 minutes would be sufficient.

To recruit participants for the Flinders University pilot, the researcher and supervisor selected appropriate topics and contacted their coordinator to get permission to visit

their classes to invite students to participate in this study. Three topics from the Faculty of Education, Humanities and Law and Faculty of Social and Behavioural were chosen. After receiving permission, the researcher arranged an appointment with the lecturer to visit classes and do a 10 minute presentation inviting students to participate in the survey. Information sheets for participants were given to the lecturer for students to take at the end of the lecture. A total of 19 completed forms were submitted.

To recruit participants for the pilot study at International Islamic University Malaysia the researcher contacted the university through a PhD student at Flinders University. After permission was granted the researcher sent an email to the students including the online link for the survey. The email comprised the Information Sheet for participants and the questionnaire. In total there were just 6 students who potentially could choose to participate in the online survey and all of them completed the survey.

4.2.3.6 Questionnaire Administration

The main survey was distributed in two forms: in person and online. With support from Flinders University and SACM, the researcher went to Saudi Arabia at the end of December 2013 and visited the Gulf States in January 2014, initially to Dhofar University in Oman for 4 days. After that, Bahrain was visited for 4 days followed by a trip to Bahrain's Royal University for Women and Kingdom University. After that, Qatar University was visited for 3 days and finally the researcher visited Ittihad University for 3 days. Then the researcher returned to Saudi Arabia to collect data from the remaining universities. In the following section, the questionnaire's administration for students, faculty members and administrative staff will be described.

Students: University lecturers were consulted on the availability of students to schedule questionnaire distribution to them. About 40 classes were visited with appropriate approval and consent forms. Instructors offered their time at the beginning of their class to distribute and collect the questionnaires. Whilst the intention was to personally hand out the questionnaires to maximise the response rate, Saudi legal restrictions do not allow contact between men and women. Thus the researcher delivered the surveys to the male students and a female instructor handed them out to the female students. During the distribution of questionnaires to the female participants, the researcher and instructor used a mobile phone to field any questions.

Questionnaires returned from this sampling procedure yielded 511 respondents with about 65% male participants and 35% female participants.

Faculty members: After receiving permission from universities, the researcher started to contact their schools to facilitate the distribution of the survey to faculty members. More permission from the school was required to contact faculty members for their participation. A formal invitation was sent via email to faculty members early in 2013. The letter included information about the research, the researcher, and noted that the Flinders University Ethics Committee had approved the approach. A schedule with times and places for visiting was subsequently arranged with each person during visits to their institutions. Due to gender segregation regulations in the Saudi education system, the researcher delivered the surveys to the male faculty members. The researcher posted the survey to the deans of female schools which were then handed to and collected from the female faculty members.

Most of the contacted faculty members answered the survey on time, although some either refused to participate or would complete the survey and leave it at the school office to be picked up. They would contact the researcher when it was completed. No phone calls were received. The researcher contacted the school office again, but only a small number were picked up on completion. A total of 142 completed forms were returned, giving a response rate of around 75% for male participants and 25% for female participants.

Administrative staff: Due to difficulties in contacting administrative staff the researcher visited different university department managers to facilitate the collection of data. Some departments asked to leave the survey and they would distribute and collect it. Other departments accepted the responsibility of the researcher to distribute and collect the survey. Due to gender segregation regulations in Saudi Arabia's universities, the researcher delivered the surveys to the male staff and male departments, and posted the survey to women managers who then handed it to and received it from the female faculty members. Most participants answered the survey on time whereas others left it to the head of the department to pick up. A total of 121 completed forms were returned, giving a response rate of around 60% for male participants and 40% for female participants.

4.2.4 Data Analysis Procedures

In research, the data analysis stage is considered to be the most meaningful, in which raw data is converted into meaningful information to answer research queries (Creswell, 2013; Johnson & Christensen, 2013). This stage involved quantitative data so the analytical procedures were chosen to be consistent with the character of the data. A thematic analysis approach suggested by Minichiello, Aroni, and Hays (2008) was employed for the quantitative data, whilst descriptive statistics such as frequency, percentage, means, and standard deviation served to examine the quantitative data. Once the survey data was collected, it was investigated and evaluated using quantitative descriptive statistical tools. Specialised software has been recommended by Bryman (2015) to facilitate this process, so Statistical Package for Social Sciences (SPSS), version 22 was employed. Prior to the analysis, data was coded by assigning labels to the information obtained. In order to enter the data into SPSS all the data collected was reviewed to determine what codes were necessary to perform statistical analysis. Some of the questionnaires had data that did not have a natural coding identified and required a written answer, so a MS Excel spreadsheet was developed to keep the course of action organised. Data was entered into the spreadsheet and then imported into SPSS for the analysis process (Ingutia-Oyieke, 2008). All data collected was stored in a locked filing cabinet at Flinders University, with access limited only to the researcher and his supervisor.

4.3 Data Analysis and Results

This section presents the data gathered using the questionnaire and is organised into four parts. The first section describes the demographic information about students, faculty members and administrative staff. The second presents information about participant and university electronic systems and Internet connections. The third is concerned with information regarding participant computer skills and training courses they have attended. The fourth and last section outlines information about participant attitudes and willingness to use ICT and related technology in their work and life.

This chapter includes tables that illustrate the key findings of the data. Appendix A contains a complete set of tables which also contain more statistical numbers and test results, including the frequency (participant sample size) and/or percentage (proportion of total sample population) of the responses for each survey question.

Where appropriate, statistical tests such as mean (*M*), Pearson's Chi-square test ($\chi 2$), standard deviation (*Sd.*) and statistical significance (*Sig.*) are also provided.

4.3.1 Demographic Information

Table 4-5 summarises the distribution of students in the universities. There is a total of 388 Saudi students from 10 Saudi Arabian universities and the remaining 123 are from institutions in 5 Gulf States. Table 4-5 also indicates faculty members' university distribution, most of whom work in Saudi universities (107 in 9 universities) and 35 in 4 universities in the Gulf States. In terms of university staff distribution, Table 4-5 indicates 95 Saudi staff working in 9 universities and 26 in 5 universities in the Gulf States.

There is a big difference in the populations of Saudi Arabia and the other Gulf States countries and this impacts on the number of students and faculty and staff members. During January most of the Gulf States are on New Year holidays accept Saudi Arabia and this created only a small number of students of the Gulf States universities available for interviews.

Table 4-5 Distribution of participants according to country and university

Country	University Name	Students		Faculty members		Administrative staff	
		f	Percentage	f	Percentage	f	Percentage
United Arab Emirates	Ittihad University	30	5.9%	11	7.7%	6	5%
Qatar	Qatar University	20	3.9%	4	2.8%	6	5%
Bahrain	Royal University for woman	17	3.4%			1	0.8%
	Kingdom University	23	4.5%	8	5.6%	7	5.8%
Saudi Arabia	Shaqra University	79	15.5%	22	15.5%	18	14.9%
	Sattam bin Abdulaziz University	39	7.6%	7	4.9%	10	8.3%
	Umm Al-Qura University	40	7.8%	7	4.9%	6	5%
	Tabuk University	30	5.9%	11	7.7%	5	4.1%
	Islamic University	37	7.2%	12	8.5%	13	10.7%
	King Abdulaziz University	37	7.2%	14	9.9%	7	5.8%
	King Khalid University	13	2.5%	12	8.5%		
	Taif University	40	7.8%			9	7.4%
	Majmaah University	31	6.1%	10	7%	10	8.3%
	Qassim University	42	8.2%	12	8.5%	17	14%
Oman	Dhofar University	33	6.5%	12	8.5%	6	5%
Total	15	511	100%	142	100%	121	100%

Table 4-6 presents the students' characteristics including gender, age, class attendance and where they live while attending university. Out of 511 respondents who participated in the study, 65.3% were males and 34.6% were females and this was expected. In terms of age, 90.6% of students were between 18-24 years, which is the largest category. This age group is typical for university students in Saudi Arabia and the Gulf States (UNESCO, 2009; Al Rajhi, Al Salamah, Malik & Wilson, 2012). Most

students (34.1%) were in the first year level, 28.9% were in the second year level and 19.7% were studying third year. Most students (80.8%) live with their families, which is expected because most students live at home until they marry unless they need to study or work away from their family residence.

Table 4-6 Demographic information about the participants

Information		Students			Faculty members			Administrative staff		
		f	Percent	Saudi	f	Percent	Saudi	f	Percent	Saudi
Gender	Male	334	65.3%	74%	106	74.6%	74.50%	72	59.5%	83.30%
	Female	177	34.6%	61.10%	36	25.4%	77.80%	49	40.5%	71.40%
	Total	511	100%		142	100%		121	100%	
Age	18 – 24 years	463	90.6%	79%	8	5.6%	100%	12	9.9%	75%
	25 – 29 years	33	6.4%	48.50%	13	9.2%	69.20%	35	28.9%	88.60%
	30 – 34 years	7	1.3%	25%	19	13.4%	89.50%	31	25.6%	80.60%
	35 – 39 years	6	1.1%	66.70%	39	27.5%	87.20%	17	14%	76.50%
	40 – 44 years	1	0.2%	0%	27	19%	74.10%	15	12.4%	60%
	45 years and over	1	0.2%	100%	36	25.4%	52.80%	11	9.1%	72.70%
	Total	511	100%		142	100%		121	100%	
Class Standing	First year	174	34.1%	82.80%						
	Second year	148	28.9%	75.70%						
	Third year	101	19.7%	79.40%						
	Fourth year	48	9.3%	59.20%						
	Graduate study	40	7.8%	60.50%						
	Total	511	100%							
Living	On campus	20	3.9%	53.30%	3	2.1%	0%			
	Off campus				139	97.9%	77%			
	Apartment	26	5.1%	78.60%						
	Share house	45	8.8%	88.20%						
	With my family	413	80.8%	74.90%						
	Other	7	1.3%	100%						
	Total	511	100%		142	100%				
Experience	1-5 years				46	32.4%	82.60%	70	57.9%	91.40%
	6-10 years				40	28.2%	80%	28	23.1%	60.70%
	10-20 years				36	25.4%	72.20%	18	14.9%	55.60%
	More than 20 years				20	14.1%	55%	5	4.1%	80%
	Total				142	100%		121	100%	
Education	Less than High School							24	19.8%	91.70%
	Diploma				0	0%	0%	18	14.9%	100%
	Bachelor				12	8.5%	91.70%	66	54.5%	71.20%
	Master				58	40.8%	82.80%	12	9.9%	58.30%
	PhD				72	50.7%	66.70%	1	0.8%	100%
	Total				142	100%		121	100%	

Also, Table 4-6 displays the faculty members' characteristics including gender, age, place of residence, teaching experience and education qualifications. In the table frequency (f) indicates the number of participants, "Percent" is the percentage of participants out of the total and "Saudi" is the percentage of the Saudi participants. Out of 142 respondents who participated in the study, 74.6% were males and 25.4% were females. In terms of age, 27.5% of faculty members were between 35-39, which is the largest category, while 25.4% were 45 years and over. Most (97.9%) faculty members resided off campus, and most (32.4%) had between 1-5 years of teaching experience,

while 28.2% had taught for between 6-10 years. The majority (50.7%) of faculty members have PhDs and 40.8% have Masters degrees.

Finally, Table 4-6 reveals the administrative staff characteristics including gender, age, experience and education qualifications. Out of 121 respondents who participated in the study, 59.5% were males and 40.5% were females. Regarding age, 28.9% were between 25-29 years, which constitutes the largest category, and 25.6% were between 30-34 years. The majority (57.9%) of staff have worked for between 1-5 years since most universities are basically new institutions; 23.1% of staff have worked for 6-10 years. The majority of staff (54.5%) have Bachelor degrees, 14.9% have a Diploma and 19.8% did not complete high school.

Although the sample population has a similar proportion of males and females and the invitation letter and email for the full-scale study encouraged both genders to participate in the study (Appendices L-K), as shown in Table 4-6 more males than females completed the questionnaire. The sample's imbalance could be due to cultural reasons in the Gulf States and especially in Saudi Arabia. In Saudi Arabian universities, the genders are segregated and this causes difficulties in directly accessing female students. It is noted that in terms of faculty members' age, most are over 40 years and their answers could be linked to motivation, ICT skills and ICT usage.

4.3.2 Infrastructure[1]

One of the most significant factor that may affect the use of ICT is infrastructure that is owned by the participant or the university, or another provider such as a telecommunication/electronics company (Altameem, 2013; Ziaie, 2013). In this section, students, faculty members and administrative staff answered questions on their university's infrastructure and the problems that emerged in trying to access and use it efficiently.

4.3.2.1 Computer Devices

Many people who work and study at the universities do not have their own computers and some cannot bring them to the institution (Bingimlas, 2009). For this reason, the

[1] This section is based on the publication titled ('A Comparison of ICT Infrastructure in Saudi Arabian and Gulf Sates Universities', Fahad Alturise, Paul R. Calder and Brett Wilkinson, SAI Computing Conference 2016) and has been reformatted to departmental guidelines.

universities must make computers available to students, faculty members and staff so that they can do their work speedily and efficiently.

Table 4-7 summarises participant access to their home and/or university computer in Saudi Arabia and the Gulf States. The data on access to computer devices at home shows 74% of Saudi university students own at least one computer device or more such as a desktop, laptop, smartphone and tablet computer, while 91.9% of Gulf States university students have them. Concerning the faculty members results, Table 4-7 shows 84.1% of Saudis own at least one computer device or more compared to 74.3% in the Gulf States. Finally, Table 4-7 indicates that 76.8% of Saudi administrative staff own at least one computer device or more compared to 76.9% of Gulf States university staff.

The second question summarises participant access to a university computer. Table 4-7 shows 62.89% of Saudi students have access while 92.68% of Gulf States students have access. Also, it shows 71% of Saudi faculty members have access while 94.30% of Gulf States faculty members have access. Furthermore 70.50% of Saudi staff use the computer in their university office in contrast to 84.60% in the Gulf States.

The third question concerned student access to a university PC in a computer suite in Saudi Arabia and the Gulf States. It emerges that 55.20% of Saudi students have access compared to 91.90% of Gulf States students. The fourth question concerns student access to a university PC in the library: 43.30% of Saudi students have it while 93.50% of Gulf-State students (more than double that of Saudi Arabia) have such access.

Table 4-7 Computer devices at home and university

Information	Students		Faculty members		Administrative staff	
	Saudi	Gulf States	Saudi	Gulf States	Saudi	Gulf States
Having a personal computer	74%	91.9%	84.1%	74.3%	76.8%	76.9%
Accessing a university computer	62.89%	92.68%	71%	94.30%	70.50%	84.60%
Accessing a university PC in a computer suite	55.20%	91.90%				
Accessing a university PC in the library	43.30%	93.50%				

This is a very important finding because about 38% of Saudi participants do not have access to a PC through university services such as email, learning management system, libraries and the institution's website. Consequently, students do not have a choice whether to use their devices at home or the university. This demotivates students from accessing the required services and could have a 'knock on' demotivating effect for

faculty members who realise that student participation is low in accessing online services and that students cannot communicate electronically with the university's services (Alarabi, 2013).

It is difficult for faculty members to do their work without a PC in their office. Faculty members require a reliable PC to access the university system and participate in teaching activities, and to encourage students to participate as well. This lack of electronic/digital system and infrastructure gives faculty members a logical excuse for not utilising university services. Lack of access to a computer for an administrative staff member has less of an impact on learning but it is still important that all university departments improve in this area. Administrative personnel sometimes do not have the skills to deal with technology but they will have to acquire such skills in order to improve their workplace performance. Universities should offer not just better infrastructure but also initiate proper training programs so staff can use computers and related technology. Such training must be provided by suitably qualified professionals who can also provide support or back-up services.

4.3.2.2 Internet Connection

One of the integral aspects of modern-day infrastructure is having Internet connection. Universities now do so for many reasons, for instance sharing internal and external data or information, access to website pages, emails and other uses. Saudi Arabia's universities and their campuses experience many problems concerning reliable Internet connection.

4.3.2.2.1 Internet Availability

Table 4-8 describes the Internet connection according to students, faculty members and staff. Firstly, most Saudi students (89.7%) have Internet connection at home such as high-speed (ADSL), dial-up, Wi-Fi, mobile phone network (3G) and others, compared with 92.7% of students in the Gulf States. Table 4-8 also highlights the Internet connection at Saudi and Gulf States universities; it is 43.60% for Saudi students, and almost twice as high (78%) for Gulf State students. Additionally, 53.40% of Saudi students who have access to the Internet at university assert that they have access to it via a computer in the computer suite or library compared to 81.30% of Gulf States students. It is evident that 47.90% of Saudi students have online access using their university's Wi-Fi while 78.90% of Gulf States students have such access.

Table 4-8 summarises the availability of Internet connection in different areas from the faculty members' perspective. In Saudi Arabia, 93.5% of faculty members have Internet connection at home such as high-speed (ADSL), dial-up, Wi-Fi, mobile phone network (3G) and others, compared to 97.1% for Gulf States faculty members. Moreover, 82.20% of Saudi faculty members have access to the Internet at university compared to 85.70% in the Gulf States. 70.10% of Saudi faculty members who have access to the Internet at university mention they do so via a fixed computer in their office, compared to 91.40% in the Gulf States. Apparently, 40.20% of Saudi faculty members can access the Internet in the computer suite or library compared to 60% in the Gulf States. In addition, 28% of faculty members in Saudi Arabian universities access the Internet through their personal laptop which is connected to a wired network compared to 54.3% in the Gulf States universities. Finally, 34.60% of Saudi faculty members point out that they can access the Internet using any mobile device connected via the university Wi-Fi compared to 62.90% of faculty members in the Gulf States.

Table 4-8 also summarises the availability of Internet connection in different areas from the administrative staff perspective. It emerges that 83.2% of Saudi staff have Internet connection at home, for example high-speed (ADSL), dial-up, Wi-Fi, mobile phone network (3G) and others, compared to 96.2% of Gulf States university staff. In Saudi Arabia, only 29.50% of staff can access the Internet at university compared to 92.3% of Gulf States staff. Moreover, 82.10% of Saudi staff who have access to the Internet at university state they can do so via a fixed computer in their office compared to 96.20% of staff members in the Gulf States.

Table 4-8 Computer and Internet at university

Information	Student		Faculty member		Administrative staff	
	Saudi	Gulf States	Saudi	Gulf States	Saudi	Gulf States
Having Internet connection at home	89.7%	92.7%	93.5%	97.1%	83.2%	96.2%
Having access to the Internet at university	43.60%	78%	82.20%	85.70%	29.50%	92.30%
Fixed computer in my office			70.10%	91.40%	82.10%	96.20%
Fixed computer in computer suite or library	53.40%	81.30%	40.20%	60%	30.50%	34.60%
Personal laptop connected to wired network	32.20%	43.10%	28%	54.30%	34.70%	30.80%
Personal laptop connected to dial-up	21.10%	26%	12.10%	20%	20%	11.50%
Mobile device connected via university Wi-Fi	47.90%	78.90%	34.60%	62.90%	44.20%	42.30%

If we look at the data for the number of academics who have access to a mobile device connected to the university's Wi-Fi system, we can see that approximately the same number of respondents indicated that they do not have access to a desktop computer in the office. This could mean that those who answered yes to having such access may

not need to have a desktop in their office. Even with some overlap this would suggest that almost all academics do have access to a connected device, whether that is a desktop computer or laptop. However, it is disheartening to see the lack of services being provided to the students. Again a comparison with results from the Gulf States universities indicates that academic access to these resources is much better.

The Internet is a critically important tool for helping researchers and faculty members (Jain, 2016). Faculty members in the Saudi universities find it difficult to do their research, especially when preparing for lectures and accessing resources available online (Alkhalaf, 2013). They experience difficulties in accessing university electronic services for important details such enrolment, email, learning management system (LMS), and so on. Furthermore, they cannot liaise with administrative staff electronically when holidays, conference attendances and other matters need to be finalised. This constitutes an important reason why some universities in Saudi Arabia do not use ICT services effectively.

The lack of access to desktop devices in a computer laboratory or the library presents an important issue regarding student connectivity, development, and general research needs. Given that approximately half the Saudi Arabian respondents answered that they do not have ready access to these services, it represents a critical issue concerning effective individual usage as well as classroom-based education practices. In comparison the students enrolled in Gulf States universities have greater access and therefore better connectivity with the wider world. The same pattern is seen with students accessing the university's Wi-Fi from their personal laptops. Effective access to Wi-Fi could potentially resolve the difficulties encountered by Saudi students in the computer labs with desktop devices. However, their inability to access this resource compounds the problems of lack of connectivity and access to a wider variety of resources. It is clear from the responses that the Saudi universities provide less access to resources for their students in comparison to the Gulf States universities. This problem is something that needs to be resolved to ensure the quality of education is maintained and improved in the Saudi universities.

Having access to the Internet for students will encourage them to stay at university and do research (Alkhalaf, 2013). The effectiveness of a university's ICT services will be severely compromised if students cannot access the Internet. In order to transfer all

their processes from a paper to electronic format, Universities will need to link all administrative staff with others via the Internet. Lack of online/electronic connection in Saudi Arabian universities with campuses located far from a major city or the main campus will mean that electronic administrative services are less effective, resulting in staff and students in different regions not being able to communicate.

4.3.2.2.2 Internet Quality

This section summarises the quality of Internet connection in different categories from the participants' perspective. Table 4-9 shows the reliability of a university's Internet connection for students in different countries, on a scale where 1 indicates poor quality and 5 indicates excellent quality. In the Saudi Arabian universities Table 4-9 shows that students who indicated that Internet connection is available had a mean reliability of 3.05 (good) compared to 4.01 (very good) for the Gulf States students. Also, the mean of the speed of Internet connection for Saudi students is 2.98 compared to 3.82 for the Gulf States.

After that, Table 4-9 describes the quality of Internet connection in different categories from faculty members' perspectives. Firstly, Table 4-9 shows Saudi faculty members indicate that the mean of reliability was 3.56 (between good and very good) compared with 4.1 (very good) for faculty members in the Gulf States. Furthermore, the mean of the speed of Internet connection for faculty members in Saudi institutions is 3.35 compared to 3.91 for the Gulf States faculty members.

Finally, Table 4-9 tabulates the quality of Internet connection in different categories from the perspective of staff. Firstly, in terms of the reliability of the connection, Saudi staff indicated that the mean of reliability was 3.33 (good) compared with 4.38 for staff in the Gulf States universities (very good). Secondly, referring to Internet connection speed, the mean of Saudi staff rating is 3.19 compared to 4.22 for the Gulf States staff.

Table 4-9 Quality of Internet connection at university

	Students		Faculty members		Administrative Staff	
	Saudi	Gulf States	Saudi	Gulf States	Saudi	Gulf States
Reliability	3.05	4.01	3.56	4.17	3.33	4.38
Speed	2.98	3.82	3.35	3.91	3.1	4.22

Scale: 1= Poor, 2= Fair, 3= Good, 4= Very Good, 5= Excellent

If we combine the results described in section 2.1 regarding computer devices with those of this section, faculty members find it difficult to access the Internet even if it

is available because many do not have a PC in their office. Yet, this capability is very important to academics who need the means to retain all their data on the university server. The Internet is very important for faculty staff in keeping up-to-date in their field of research or expertise. Faculty members have to access the university services many times each day to send emails, record student grades and do administrative jobs. Not being able to do so wastes their time and means resources are not being used effectively.

While it is not important for all staff in university to have access to the Internet, this finding reveals to us the state of the infrastructure and how it affects all stakeholders. There are disadvantages to accessing the Internet but it is nonetheless important to be connected to it and monitor its usage. Poor ICT infrastructure means an inability to implement other ICT solutions such as use server tools like email via intranet, share files, etc.

We can see that even if students have access to the Internet via the library, labs or even from their own devices there is still a problem. Specifically, the quality of this connection is not good enough for some students because it is too slow or it is not available all the time, or the Wi-Fi area is not available on most campuses. This poor Internet quality will affect their use of the university system and will not help them to stay at university to complete their programs or courses. Universities have to offer students Internet access that is of high quality and it should cover all campuses. Having Wi-Fi will encourage them to keep studying at university.

4.3.2.3 Software and Services System

Systems and software must be of high quality, with good back-up and relevant to the institution and other users. This section consists of two main parts: firstly, the availability of services and secondly, the effectiveness of such available services. These services are divided into three main types, these being education, communication and administrative.

4.3.2.3.1 Availability of Education Services

Table 4-10 describes the availability of education services by participants in Saudi Arabia and the Gulf States universities. Firstly, participants were asked about accessing course materials via websites. For the Saudi Arabian students, 4.4% point out that such access is not available and when it is available 3.1% never use them,

compared to less than 1% in the Gulf States universities. Secondly, concerning the availability of download/stream lecture videos for Saudi students, 11.9% indicate that it is not available and 13.1% never use it, whereas 8.9% of Gulf States students indicate that the service is not available and 10.6% that it is available but they do not use it. With reference to the availability and frequency of use for submitting assignments online, 10.8% of Saudi Arabian students believe this option is not available and 12.6% of them never use it. In the Gulf States it is 5.7% and 4.9%, respectively. The table illustrates the availability for full learning management systems in in various countries' universities. About 13.7% of Saudi Arabian students contend that a full learning management system is not available and 17.3% that they never use this service, compared to less than 8.9% and 10.6% in the Gulf States universities.

The availability of education services and frequency of use from the faculty members' perspective is summarised in Table 4-10. Firstly, they have been asked about offering course materials via websites. According to 15.9% of Saudi Arabian universities' faculty members, distributing course materials online is not available, and if it is available 12.1% of them never do so. Conversely, less than 9% in the Gulf States universities do not have this service and less than 9% never use it despite its availability. Secondly, Table 4-10 summarises the availability regarding download/stream lecture videos. It shows that 20.6% of Saudi Arabian universities' faculty members contend that download/stream lecture videos are not available, and 20.6% of faculty members never use this service, compared to less than 5.7% in the Gulf State universities when it is not available and less than 14.3% where is not used.

The availability and frequency of use with reference to submitting students' assignments are tabulated in Table 4-10. For Saudi Arabian universities' faculty members, 13.1% reveal that students' submitting their assignments online is not available and 15.9% of faculty members never use this service, compared to less than 5.7% in the Gulf States universities and less than 14.3% who never use this service. The availability of a complete learning management system is also summarised here. It is documented that 22.4% of Saudi Arabian universities' faculty members believe that a complete learning management system is not available and 17.8% never use this service. Conversely, in the Gulf States universities the statistics are less than 28.6% and 14.3%, respectively.

Table 4-10 Availability of education services

	Students				Faculty members			
	0		1		0		1	
	Saudi	Gulf States	Saudi	Gulf States	Saudi	Gulf States	Saudi	Gulf States
Course material via website	4.4%	0.8%	3.1%	0.8%	15.9%	8.6%	12.1%	8.6%
Download/stream lecture video	11.9%	8.9%	13.1%	10.6%	20.6%	5.7%	20.6%	14.3%
Submit assignment online	10.8%	5.7%	12.6%	4.9%	13.1%	5.7%	15.9%	14.3%
Full learning management system	13.7%	8.9%	17.3%	10.6%	22.4%	28.6%	17.8%	14.3%

Scale: 0= Not Available, 1= Never Use

Even if a university has a good infrastructure and networking capability, a problem can still arise if electronic services and especially education services are not available or not of good quality. Such services provide many features to support education at most universities because despite having adequate services in another area, they still need to care about education systems as well. Having poor systems in place will affect their use of other parts of the university system and discourage stakeholders from utilising them because there is a discrepancy between services. Universities have to offer a high quality ICT system that covers all aspects and functions so that faculty members and students are encouraged to use it. The institutions should also link students and faculty members to other campuses so that there is more participation in the university education system. There is a discrepancy between faculty member expectations and the system services being offered, and this gap should be filled by training and education sessions, and ICT support services.

4.3.2.3.2 Availability of Communication Services

Table 4-11 describes the availability of communication services and frequency of use for students in the Saudi Arabian and Gulf States universities. Firstly, they were asked about their university's email system. Evidently, 10.3% of Saudi Arabian students point out a university email system is not available and when it is available 13.9% of them never use it, compared with only 0.8% and 3.3% in the Gulf States. Secondly, 13.1% of Saudi student feel that a Messaging system is not available and 12.6% never use it, compared to less than 8.7% and 12.2%, respectively, for the Gulf States universities. Finally, the availability of a social networking service for students in both regions is tabulated. The table shows that 11.9% of Saudi Arabian students believe that it is not available and 11.1% never use it. In the case of the Gulf States universities, this is less than 6.5% where it is not available and 12.2% who never use it.

Table 4-11 also shows the availability and use of communication services by faculty members in the Saudi Arabian and Gulf States institutions. Firstly, they were asked

about their university's email system. It emerged that 4.7% of Saudi Arabian universities' faculty members believe an email system is not available but when it is available 8.4% never use it, while no participant reported that email is not available and or that they never use in Gulf state countries universities. Secondly, the table reveals the Messaging system's availability in the Saudi Arabian and Gulf States institutions. For this variable, 16.8% of Saudi Arabian faculty members contend that the Messaging system is not available and 13.1% never use this service, compared to less than 14.3% and 4.3%, respectively, in the Gulf State universities. Finally, social networking in the two regions is summarised with reference to availability. Here, 21.5% of Saudi Arabian universities' faculty members claim that social networking is not available and 11.2% never use it. In comparison, less than 11.4% of Gulf State universities' faculty staff believe it is not at all available while 17.1% never use this service.

Finally, Table 4-11 describes the availability of communication services according to administrative personnel's perspectives. Firstly, they were asked about their university's email system, in which 9.5% of Saudi Arabian staff pointed out that the system is not available and when it is, 5.3% never use it. Conversely, all staff participants from Gulf States universities reported that they have access to email and use it.

Table 4-11 Availability of communication services

	Students				Faculty members				Administrative Staff			
	0		1		0		1		0		1	
	Saudi	Gulf States	Saudi	Gulf States	Saudi	Gulf States	Saudi	Gulf States	Saudi	Gulf States	Saudi	Gulf States
University email system	10.3%	0.8%	13.9%	3.3%	4.7%	0%	8.4%	0%	9.5%	0%	5.3%	0%
Messaging system	13.1%	8.7%	12.6%	12.2%	16.8%	14.3%	13.1%	14.3%	11.6%	11.5%	25.3%	19.2%
Social network	11.9%	6.5%	11.1%	12.2%	21.5%	11.4%	11.2%	17.1%	9.5%	23.1%	14.7%	7.7%

Scale: 0= Not Available, 1= Never Use

The data suggests that stakeholders in the Gulf States universities use communication services more frequently than Saudi stakeholders, perhaps because they do not realise that such communication services are paid for by the university, not themselves. Not having these services makes it difficult for students and faculty members to communicate with each other and compromises workplace and learning procedures. The most important tool in communication is email but it is not implemented in all Saudi Arabian universities for administrative staff. This is due to qualifications, ICT

skills and other issues. Managers of administrative staff can benefit from having email; for example they could use email to manage employee attendance and other information. The data suggests that students in the Gulf States universities have more communication channels than those in Saudi Arabia, which helps their education and future prospects in terms of understanding ICT. Administrative and faculty staff members must encourage students to use electronic tools and this means providing them in the first place. Many Saudi Arabian students do not use email because it is not available.

4.3.2.3.3 Use of Electronic Mail[2]

One interesting finding is that, given the prevalence of ICT in education and when the university is planning to enter e-learning in a big way, 86 (11.11%) of the 774 Saudi and Gulf States respondents neither used nor had an email account. This situation is predominant in the Saudi Arabian universities 94.18%. Of this total, 12.34% were faculty members and 20.98% were administrative staff. The rest were students and of these only 5.81% were from the Gulf States universities. We did not ask participants to give any reasons for not using email. Perhaps they were educated either at a time or in an environment where ICT was non-existent and consequently had little or no need for any ICT in their work or everyday lives.

Table 4-12 displays the percentage of university stakeholders who have email accounts either at home or university. About 14% of students in Saudi universities do not have email addresses compared to about 4% in the Gulf States universities not having one. Approximately 9% of faculty members in Saudi universities do not have an email address while all employees in the Gulf States universities do so. Finally, about 18% of administrative staff in Saudi universities do not have an email address while all staff employees in the Gulf States universities do. Overall, we surmise that email accounts are more common in the Gulf States universities compared to Saudi Arabia because of factors such as familiarity with technology, easy access to ICT services and ICT playing a major role in people's daily lives.

[2] This section is based on the publication ('E-mail use by the faculty members, students and staff of Saudi Arabian and Gulf states Universities', Fahad Alturise, Paul R. Calder and Brett Wilkinson, (IJACSA) International Journal of Advanced Computer Science and Applications) and has been reformatted to departmental guidelines.

Table 4-12 University stakeholders with access to email

Information	Students		Faculty members		Administrative staff	
	Saudi	Gulf States	Saudi	Gulf States	Saudi	Gulf States
Having an email account	86.10%	95.90%	90.70%	100%	82.10%	100%

Table 4-13 shows the frequency of stakeholders' use of emails, on a scale where 1 indicates no email use at all and 6 indicates that email is used several times per day. The mean of the frequency for Saudi students is 3.61 which means they use it more than once a month but less than once a week. In comparison the mean of frequency is 4.56 for Gulf States students, which indicates that they use it more than once a week but less than once a day. Moving to faculty results, Table 4-13 shows the frequency for Saudi faculty members' email use has a mean of 5.21 compared to 5.63 for Gulf States faculty members (both more than once a day). Finally, Table 4-13 also shows that the mean of frequency of email use for Saudi administrative staff is 4.61 (more than once a week but less than once a day) compared to 5.92 for Gulf States staff, which indicates they check their emails several times each day.

Table 4-13 University stakeholders' frequency of checking email

Information	Students		Faculty members		Administrative staff	
	Saudi	Gulf States	Saudi	Gulf States	Saudi	Gulf States
Email	3.61	4.56	5.21	5.63	4.61	5.92

Scale: 1=Never, 2= Less than once a month, 3= About once a month, 4= About once a week, 5= About once a day, 6= Several times per day

In summary, the data suggests that students in the Gulf States universities use email more frequently than Saudi students. This use of email could be due to faculty encouragement or a university system which compels students and staff alike to understand emails in everyday transactions. The data indicates that faculty members in the Gulf States universities use email a little more frequently in their daily activities and duties than Saudi faculty members, but that Gulf States administrative staff use email much more frequently than their Saudi counterparts. These differences suggest that Gulf States faculty members understand the benefits of email and its advantages in learning, and the Gulf States staff understand the benefits of email and how it assists them in their work.

When combined with data on the availability and quality of infrastructure (Table 4-9), these results show that having and using email in university has a significant positive correlation ($p<.001$, two-tailed) with good Internet connection for all classes of participants. For students, the correlation coefficient was r (511) = 0.411, for faculty

it was *r* (142) = 0. 301 and for administrative staff *r* (121) = 0.484. These correlations suggest that if a university has a good Internet connection, this will directly and positively affect and increase participants' email usage. Similarly, having access to a university computer (Table 4-7) results in a positive correlation ($p<.001$, two-tailed) between having and using email in university: students *r* (511) = 0.307, faculty members *r* (142) = 0.329, and staff *r* (121) = 0.323. This is logical because if the participants cannot access university computer devices and connect to the Internet then they will not have the opportunity to access email.

4.3.2.3.4 Availability of Administrative Services

Table 4-14 highlights the availability of administrative services according to students in both regions' universities. Firstly, they were asked about their university website. It emerged that 1.8% of Saudi Arabian universities' students believe that the website is not available and when it is available 2.6% never use it. In contrast, no Gulf State student reported that their university did not have a website or that they did not use it. Table 4-14 also documents the availability of publishing students' grades online. For Saudi Arabia, 5.7% of students contend that publishing students' grades online does not happen and 2.6% never use this service. Meanwhile in the Gulf States universities, less than 2% of students think it is not available and all students use this service when it is available.

Table 4-14 focuses on the availability of administrative services in Saudi Arabia and the Gulf States for faculty members. Firstly, they were asked about their university's availability of an online enrolment system in both regions. Here, 15.9% of Saudi Arabian faculty members note that such a system is not available and 14% of faculty members never use it. In contrast, less than 3% in the Gulf States universities assert it is not available and 14.3% never use this service.

Table 4-14 Availability of administrative services

	Students				Faculty members			
	0		1		0		1	
	Saudi	Gulf States	Saudi	Gulf States	Saudi	Gulf States	Saudi	Gulf States
University website	1.8%	0%	2.6%	0%	2.8%	2.9%	0.9%	0%
Student enrolment system	4.4%	8.9%	5.7%	4.9%	15.9%	2.9%	14%	14.3%
Publish grades online	5.7%	1.6%	2.6%	0%	0.9%	8.6%	5.6%	14.3%

Scale: 0= Not Available, 1= Never Use

The findings for faculty members in the Saudi Arabian and Gulf States universities indicate the fact that online administrative services are used less frequently in Saudi

Arabia compared to the Gulf States. Quite clearly the Gulf States universities have better infrastructure and services. Administrative services are very important for universities and their stakeholders because these services facilitate learning duties that are linked to people's work. Administrative services are very important because they allow staff to communicate with other stakeholders in the university campuses.

Comparing the Saudi and Gulf States university staff, the latter employ IT much more than Saudi staff, mainly due to system availability, staff skills and training, staff qualifications and cultural issues. Those in charge of managing Saudi Arabia's institutions do not believe that administrative staff are important because education is considered to be more important than the administrative services required to back them up.

It is possible that student answers concerning administrative services availability may not indicate that the services are not available; it may actually be available but they do not know about it or use it. This is due to the level of university usage and encouragement from faculty members and administrative staff. University leaders, staff and faculty members should encourage students to use those services and other systems as well. The findings for faculty members reflect that their use influences student usage which is low. Faculty members in the Gulf States universities face the same issues and this effect on student usage is important and will affect student use of particular ICT services and their impact on learning.

Having completed a description of the service categories and connection with infrastructure, it is evident there is a significant positive correlation ($p<.001$, two-tailed) between Internet connection reliability (Table 4-9) and student use of educational services (Table 4-10, $r(511) = 0.454$), communication services (Table 4-11, $r(511) = 0.403$) and administrative services (Table 4-14 , $r(511) = 0.321$). These correlations mean that universities must improve the availability of Internet connection so that students use e-services. Many students do not have Internet connection at home due to their location, budget or cultural reasons and this means they cannot use the services.

4.3.2.3.5 Effectiveness of University E-services

Table 4-15 indicates the overall effectiveness of e-services from participants' point of view on a scale where 1 indicates that the service is not at all effective and 5 indicates

that the service is very effective. First, Saudi students state that the overall effectiveness of all available educational e-services is 3.5 compared to 4.07 for the Gulf States scenario. Students were also asked about the overall effectiveness of communication e-services. In Saudi Arabia the mean effectiveness was 3.36 compared to 4.14 for the Gulf States students. Finally, university administrative e-services in the two regions are summarised in regard to overall effectiveness. The mean for Saudi students was 3.38 compared to 3.92 for the Gulf States students.

Table 4-15 focuses on the overall effectiveness of all e-services according to faculty members in the Saudi Arabian and Gulf States universities. Firstly, they were asked about the effectiveness of all educational e-services. Faculty members as summarised in Table 4-15 point out that the overall effectiveness of all available educational electronic services is 3.5 compared to 4.03. Secondly, Table 4-15 reveals the overall effectiveness for communication services in the Saudi Arabian and Gulf States institutions. In this variable, the mean of the effective for Saudi faculty members is 3.57 compared to 4.4 in the Gulf States. Finally, university administrative e-services in the two regions are summarised with reference to overall effectiveness. The mean for Saudi faculty staff was 3.52 compared to 4.11 for the Gulf States scenario.

Finally, Table 4-15 describes the overall effectiveness of all e-services according to administrative personnel's perspectives. Firstly, they were asked about their university's e-services' effectiveness, in which Saudi Arabian staff pointed out that the mean of the effectiveness is 3.34 compared to 4.58 for Gulf States staff members. Finally, they were asked about the overall effectiveness of administrative e-services. For Saudi Arabia, staff contend the mean for overall effectiveness is 3.28 compared to 3.88 for Gulf States staff.

Table 4-15 Overall effectiveness of ICT services in university

	Students		Faculty members		Administrative Staff	
	Saudi	Gulf States	Saudi	Gulf States	Saudi	Gulf States
Education Services	3.5	4.07	3.5	4.03		
Communication Services	3.36	4.14	3.57	4.4	3.34	4.58
Administrative Services	3.38	3.92	3.52	4.11	3.28	3.88

Scale: 1= Not at all effective, 2= Mostly ineffective, 3= Neither effective nor ineffective, 4= Mostly effective, 5= Very effective

Connecting these results with the infrastructure section, there is a significant positive correlation (all $p<.001$, two-tailed) between Internet connection reliability (Table 4-9) and student-rated effectiveness of services (Table 4-15) for education (r (511) =

0.483), communication (r (511) = 0.496), and administration (r (511) = 0.386), which indicates that a high-quality Internet connection is very important to students. Similarly, there is a strong and positive correlation (p<.001, two-tailed) between Internet connection reliability (Table 4-9) and effectiveness (Table 4-15) of communication, administrative services for administrative staff: r (121) = 0.657, and r (121) = 0.522. Staff members usually do their work in the office and in office hours and they have to access the Internet through the university network. The correlation suggests that if the Internet is available this will improve the effectiveness of e-services. Interestingly, the correlation between these same variables for faculty members' correlation is not strong, perhaps because they can do most of their work anytime and anywhere.

Finally, having and using educational, communication and administrative services (Table 4-14) is positively correlated with effectiveness of services (Table 4-15). Specifically, there is a significant positive correlation (*p*<.001, two-tailed) for students in education services (r (536) = 0.486), communication services (r (536) = 0.502), and administrative services (r (536) = 0.414). For faculty members the correlation is significant (p<.001, two-tailed) for education services (r (142) = 0.583) and communication services (r (142) = 0.378). And for administrative staff the correlation is significant (p<.001, two-tailed) for communication services (r (121) = 0.395) and administrative services (r (121) = 0.364). Faculty members and staff agree that if the education and communication services are made properly available, they will use them effectively. If universities want staff to use e-services effectively, they have to provide them in a meaningful and ongoing way.

4.3.2.4 Policies and Rules

Table 4-16 summarises the faculty and staff members' points of view about policy and guidelines. Firstly, faculty members were asked their opinions about the ICT policies and guidelines for staff in the Saudi Arabian and Gulf States institutions. In Saudi Arabia there is not much agreement that the universities have well-structured ICT policies and guidelines for staff. On a scale where 1 corresponds to strong disagreement and 5 to strong agreement, the mean is equal to 3.96 in Saudi Arabia compared to 4.29 in the Gulf States. Faculty members were asked about their familiarity with the university's ICT policies and guidelines. Saudi faculty members neither agreed nor disagreed with the mean equal to 3.77 compared to 4.23 in the Gulf

States. The opinions about the university's ICT policies and guidelines are clear and easy to understand in both regions' universities and are documented in Table 4-16. Regarding the Saudi Arabian scenario, according to faculty members, the mean of their opinion is 3.59 compared to 4.14 in the Gulf States. Finally, their opinions about the university's ICT policies and guidelines being relevant and up-to-date in the two regions are summarised. The mean for Saudi faculty members is 3.38 compared to 3.94 for the Gulf States universities.

Table 4-16 also focuses on the opinions of administrative staff in Saudi Arabia and the Gulf States. Firstly, they were asked about the university's ICT policies and guidelines. In Saudi Arabian institutions, staff opinions regarding the structured of their university's ICT policies and guidelines had a mean equalling 3.77 compared with 4.42 in the Gulf States. Staff members were also queried about their familiarity with the university's ICT policies and guidelines. Saudi staff members reported a mean equal to 3.75 compared to 4.19 in the Gulf States. Thus administrative staff members' opinions about a university's ICT policies and guidelines are clear and easy to understand in Saudi Arabian and Gulf States universities. These are also documented in Table 4-16. Regarding Saudi Arabian universities' staff, the mean of their opinion is 3.5 compared to 4.27 in the Gulf States universities. Finally, staff members' opinions about the university's ICT policies and guidelines being relevant and up-to-date in the two regions are summarised. The mean for Saudi staff members is 3.54 compared with 4.15 for Gulf States universities.

Table 4-16 Statements about university ICT policy and guidelines

	Faculty members		Administrative Staff	
	Saudi	Gulf States	Saudi	Gulf States
The university has well-structured ICT policies and guidelines for staff	3.96	4.29	3.77	4.42
I am familiar with the university's ICT policies and guidelines	3.77	4.23	3.75	4.19
The university's ICT policies and guidelines are clear and easy to understand	3.59	4.14	3.5	4.27
The university's ICT policies and guidelines are relevant and up-to-date	3.38	3.94	3.54	4.15

Scale: 1= Strongly disagree, 2= Disagree, 3= Neither, 4= Agree, 5= Strongly agree

4.3.2.5 Open-Ended Questions

The questionnaire was concluded with open-ended questions asking the participants to give more information about several issues. The number of responses to these questions was very low, perhaps because of the length of the questionnaire or because all issues had already been covered. In this section, the most important answers regarding infrastructure will be presented to support other results.

A question about changes that would increase use of ICT at home was answered by 29 Saudi students' and 8 Gulf States students. Fourteen Saudi students commented that the Internet connection must be good to increase use of ICT at home. They pointed out speed of Internet, reliability, cost and 3G and 4G support. One student from the Gulf States mentioned how important it is for the Internet network to be better. Moreover, 4 Saudi students pointed out the importance of having a computer device at home.

A question about changes that would increase use of ICT at university and responses was answered by 30 Saudi students and 3 Gulf States students. Most Saudi students focused on the university infrastructure (computer devices and Internet connection). Eight students noted the need for Internet connection in university thought Wi-Fi and should be available on all campuses, and that Internet speed and reliability will increase students' use of university services. Also, six pointed out the importance of availability of computer devices in the university through the library or computer labs for all students. Other students mentioned the need to update infrastructure and have easy access to it. One Gulf States student stated that the Internet network speed is not good enough. Another student focused on the importance of the system interface being user-friendly and upgrading web portability to avoid peak traffic difficulties which impeded access.

A question about factors that prevent effective use of ICT in teaching was answered by 11 Saudi faculty members and 6 Gulf States faculty members. The Saudi faculty members talked mostly about the availability of ICT infrastructure. Eight Saudi faculty members wanted good infrastructure which is very important to use ICT effectively in teaching such as good Internet connection, computers for faculty members and students, having well equipped classrooms and reliable technology because many technical problems occur. One Gulf States faculty member highlighted how important it is for the university to provide Internet connection everywhere. Another suggested that providing computer devices to the faculty is very important to help them to use ICT inside and outside a university.

A question about changes to increase use of ICT at home was answered by 5 Saudi faculty members and 3 Gulf States faculty members. 3 Saudi faculty members noted that the cost of computer devices and Internet connection are high and one Gulf States faculty member echoed this. Another question concerned changes that would increase

faculty members' and students' use of ICT, and was answered by 11 from Saudi faculty members and 7 from the Gulf States. Six Saudi faculty members noted the importance of taking care of infrastructure (software, hardware) and having technical support in each school. Moreover, universities have to support students and help them to get computer devices at a discount price, or lending them funds to purchase computers. One Saudi faculty member and one Gulf States member responded to an invitation for other comments or insights about their experience with ICT at home or university by mentioning that universities have to support faculty members and students to use ICT effectively through good infrastructure.

Administrative staff members responded to several questions asking for more information about ICT infrastructure. A question was about factors that prevent effective use of ICT in the workplace was answered by 15 Saudi staff members responded and 5 from the Gulf States. The Saudi staff members' comments were diverse in that 3 highlighted the importance of internal network, Internet connection speed and reliability. Two pointed out the need to offer computer devices and other input and output devices. On a question about changes that would increase the use of ICT at home responses were received from 6 Saudi administrative staff and 4 from the Gulf States. All the Saudi staff asserted the need for good Internet connection at a good price to increase the use of ICT at home. Some pointed out the necessity of having their own computer device. On a question about changes that would increase the use of ICT at university, responses were received from 10 Saudi staff members and 4 from the Gulf States. Four Saudis maintained that infrastructure is vital to improving university networks, computer devices and Internet connection to facilitate using ICT for all staff. One Gulf States staff member highlighted the importance of infrastructure and that the university's network was good enough. For the final question inviting any other comments or insights, 5 Saudi staff members responded as did 2 from the Gulf States. Three Saudis believed that the university infrastructure was not good enough and had to be remedied urgently.

4.3.3 Stakeholders' Qualifications

Table 4-6 in the demographic information section shows the education level of faculty and staff members in the Gulf States and Saudi Arabian universities.

4.3.3.1 Participants' Skills

The purpose of this section is to explore the ICT skills levels that participants have. It also explores how they obtain this experience. The first question measured their computer skills levels. Level of skills is represented by a mean score based on a 5-point response scale ranked from 5 (Expert) to 1 (Non-User).

Table 4-17 presents data on students' computer skills level across a range of application software. The overall skills level for Saudi students in those computer skills were between moderate and competent compared to between competent and expert for Gulf States students. This indicates that Saudi Arabian students have poorer skills compared to the latter. They need more encouragement from faculty members to improve their skills and it is apparent that Saudi universities must overcome this problem. Faculty members have to help students at the beginning of each semester.

Table 4-17 also presents data on faculty members' computer skills level. The overall skills level for Saudi faculty members varied between competent and expert which is almost the same as that for Gulf Sates faculty staff. It is evident that faculty members in Saudi Arabian and Gulf States universities have similar skill levels.

Finally, as seen in Table 4-17, the overall computer skills level for Saudi administrative staff varied between moderate and competent compared to between competent and expert for faculty staff in the Gulf States institutions. These statistics reveal that administrative staff in Saudi Arabia have less skills or expertise than administrative staff in the Gulf States. This means that Saudi Arabian university administrative staff require good quality training courses and support to overcome difficulties and to improve how they employ ICT for designated tasks.

Table 4-17 Skills level in each types of software

	Students		Faculty members		Administrative staff	
	Saudi	Gulf States	Saudi	Gulf States	Saudi	Gulf States
Windows or other operating systems	3.78	4.33	4.25	4.46	3.95	4.38
File handling	4.09	4.43	4.45	4.6	4.31	4.38
Email	3.9	4.36	4.52	4.63	4.22	4.65
Instant messaging	3.76	4.28	4.31	4.51	3.74	4.19
Web surfing	4.19	4.52	4.49	4.66	4.2	4.19
Spreadsheets	3.37	4.05	4.05	4	3.83	4.46
Word processing	3.68	4.31	4.23	4.23	4.02	4.46
Presentation software	3.61	4.23	4.21	4.29	3.66	4.23
Web search engines	4.02	4.41	4.38	4.34	4.02	4.27
Online library resources	2.83	3.3	3.62	3.83	2.66	3.38

Scale: 1= Non User, 2= Beginner, 3= Moderate, 4= Competent, 5= Expert

In summary, Saudi Arabian university stakeholders are less expert in utilising ICT compared to their counterparts in the Gulf States. In particular the administrative staff's ICT skills are poorer in Saudi Arabia because such skills have not been actively promoted or implemented. It is paramount that the decision-makers and senior executives in Saudi Arabia's universities lead the way in changing how staff work with modern electronic technologies and Internet systems that incorporate e-services (Al Gamdi & Samarji, 2016; Al Mulhim, 2014).

Table 4-18 presents data on how important a range of methods were in helping participants obtain their ICT skills, recorded as mean scores on a scale where 2 indicates a method that was not significant and 5 represents a method that was very significant (1 indicates a method that is not applicable for that participant). For Saudi students the different methods varied between somewhat significant and significant except workshops provided by their university, which lay between not significant and somewhat significant. In comparison the Gulf States students believed that workshops provided by university and commercial training courses lie between somewhat significant and significant and between significant and very significant for self-directed learning, more practice and friends or colleagues.

Then, Table 4-18 presents data showing that both Saudi and Gulf State faculty members found self-directed learning and more practice were the most important methods, with Gulf State participants generally indicating that all methods were more significant than Saudi participants. Saudi participants also rated previous study as significant. Both groups rated workshops by their university and commercial training courses as somewhat significant.

Finally, Table 4-18 shows that Saudi administrative staff rated self-directed learning and more practice as the most important method, while workshops provided by the university were the least important. A similar pattern emerged for Gulf States universities staff although the differences between the importance of methods was not a large.

Table 4-18 Participants' methods of obtaining skills

	Students		Faculty members		Administrative Staff	
	Saudi	Gulf States	Saudi	Gulf States	Saudi	Gulf States
Previous study	3.69	3.46	4.09	3.97	3.82	4
Workshops provided by university	2.8	3.54	3.14	3.29	2.87	3.5
Commercial training courses	3.06	3.5	3.36	3.97	3.62	3.62
Self-directed learning	3.81	4.44	4.39	4.8	4.28	4.58
More practice	3.98	4.48	4.55	4.74	4.53	4.77
Friends or colleagues	3.63	4	3.77	4.11	3.93	4.08

Scale: 1= N/A, 2= Not Significant, 3= Somewhat Significant, 4= Significant, 5= Very Significant

In this section, participants noted their overall computer skills level when utilising the university system. Finally, Table 4-19 summarises participants ratings of their overall computer skills for using university electronic systems in Saudi and Gulf States universities on a scale where 1 indicates a non-user and 5 indicates an expert. Firstly, the level of skills for students in Saudi universities was between moderate and competent, compared to competent for Gulf States students. Also, it shows the level of skills for Saudi faculty members was competent compared to more than competent for Gulf States universities. Finally, Table 4-19 shows the overall computer skills for using university electronic system for Saudi staff varied between moderate and competent compared to Gulf States staff members who rated themselves as more than competent.

Table 4-19 Overall computer skills level for using university system

	Students		Faculty members		Administrative Staff	
	Saudi	Gulf States	Saudi	Gulf States	Saudi	Gulf States
Overall computer skill level using university systems	3.4	4.03	4.03	4.29	3.58	4.15

Scale: 1= Non User, 2= Beginner, 3= Moderate, 4= Competent, 5= Expert

4.3.3.2 Training and Workshops

We also asked faculty members and administrative staff about ICT training workshops that are available through their universities. Table 4-20 shows that for both. Saudi faculty members and Saudi administrative staff training courses in productivity applications such as Microsoft Word, Excel, and PowerPoint are available but places are not always available and sometimes are very restricted. In the Gulf States, faculty members and staff pointed out that training courses are readily available on request but sometimes places are not available. Table 4-20 also shows training course availability for Internet technologies such as email, messaging, and web browsing. Saudi universities members state that the training courses are available but places could be either very restricted or not always available compared to the Gulf States. In

the latter, faculty and staff members noted that training courses are available but places are hard to apply for and rarely available to all staff who require it.

Finally, Table 4-20 summarises the availability of training courses regarding education in learning management systems, on-line assessment and on-line administrative services technology for sectors such as enrolment, payment, and human resources. Saudi faculty and staff contend those courses are available but places are very restricted or sometimes not available. Gulf State participants indicated that courses also have restricted availability although not as limited as for Saudi participants.

Table 4-20 Availability of ICT training workshops at university

	Faculty members		Administrative Staff	
	Saudi	Gulf States	Saudi	Gulf States
Use of productivity applications	2.8	3.34	2.62	3.23
Use of Internet technologies	2.67	3.23	2.57	3.19
Use of educational technology & on-line administrative services	2.48	3	2.38	3

Scale: 1= Not Available, 2= Available but places are very restricted, 3= Available but places are not always available, 4= Readily available to all staff who require it

Table 4-21 summarises perspectives of faculty members and administrative staff about various aspects of university-provided ICT training. The table suggests that Saudi faculty and staff members consistently rated the training less positively than did Gulf States faculty and staff members, although the overall ratings suggest that both groups were generally positive and the differences were not large.

Training courses are very important for university staff if they are to use their institution's services effectively. There is a positive correlation between effectiveness of ICT services (Table 4-15) and availability of ICT training for using educational technology (e 4-20). The correlation is significant ((p<.001, two-tailed) for faculty members in relation to education services ($r(142) = 0.328$), communication services ($r(142) = 0.318$), and administrative services ($r(142) = 0.365$) and for administrative staff members in relation to administrative services ($r(121) = 0.311$). Offering a training course for faculty and staff members will have a direct and positive effect on access to and use of university services.

Table 4-21 Participants' opinions about university training courses

	Faculty members		Administrative staff	
	Saudi	Gulf States	Saudi	Gulf States
My campus provides appropriate ICT training for my work	3.36	3.63	3.22	3.69
I am encouraged to attend relevant ICT training workshops	3.35	3.54	3.08	3.54
I can usually get a place at an ICT training workshop when I need to.	3.35	3.51	2.88	3.31
ICT training workshops are usually well presented.	3.35	3.46	3.06	3.35
I usually find the content of ICT training workshops valuable.	3.5	3.66	3.23	3.62

Scale: 1= Strongly disagree, 2= Disagree, 3= Neither, 4= Agree, 5= Strongly agree

The data about the restricted availability of places in university training courses and workshops suggest that there is a lack of training courses and workshops which could help stakeholders to use ICT better. This could be due to lack of training quality, training areas or lack of encouragement and lack of promotion. Comparing between Saudi stakeholders and those in the Gulf States, we can see this very clearly when referring to staff members' and students' results. The next section will present the results for the question regarding the availability of ICT training workshops provided to faculty and staff members.

4.3.3.3 Open-Ended Questions

Eleven faculty members from Saudi universities and three from the Gulf States responded to an invitation to comment about factors that prevent effective use of ICT in teaching by identifying a lack of training and fear of failure, and the importance of improving their skills in ICT for their duties. When asked to comment on changes that could increase their and students' use of ICT, 11 faculty members from the Saudis and 7 for the Gulf States responded, with six Saudi faculty members pointing to the need for technical support in each school. Moreover, they mentioned the need for motivation of all faculty members even if training courses are offered by non-Saudi providers. Finally, when asked for insights or comments about their experience with ICT at home or the university two Saudi and two Gulf States faculty members mentioned that their university has to support faculty members and students to use ICT effectively through good training.

The administrative staff questionnaire also included open-ended questions asking administrative staff for more information. In relation to factors that could prevent effective use of ICT in the workplace, 14 Saudis and 6 from Gulf States responded, with 8 Saudis suggesting that the university must offer support through training so ICT is used in work duties effectively. In relation to other changes that would increase the use of ICT at home, 6 Saudi staff and 4 from the Gulf States responded, with all the

Saudi staff pointed out that training has to support use of ICT at home. In relation to changes that would increase the use of ICT at university there were 10 responses from Saudi staff and 2 from the Gulf States staff, with three Saudi staff members highlighting the importance of training for using ICT at university. Finally, regarding insights about and experience with ICT at home or university, there were only 5 Saudi and 2 from the Gulf States. Three Saudi staff emphasised the importance of training for all staff groups and departments no matter how old people were.

4.3.4 Participants' Willingness, Attitude and Ability

This section will summarise the most important and significant results regarding questions on participant willingness, attitude and ability to use ICT in the university.

Table 4-22 describes participants' attitudes to adopting new technologies. When asked for their point of view most Saudi students (36%) indicated that they use new technologies when most others in their peer group do, although 13.7% students were sceptical of new technologies and use them only when they have to and 12.9% are amongst the last of their peers to use new technology. At the other end of the scale, 19.3% of Saudi students love new technologies and are among the first of their peers to experiment with them and 18% of Saudi students like new technologies and tend to use them before others. For Gulf State students the pattern is similar, although more Gulf State students (27.6%) rate themselves as amongst the first adopters and fewer (10.6%) as amongst the sceptics.

Table 4-22 also describes faculty members' attitudes to adopting new technologies. For both Saudis and Gulf State participants most (over 40%) rated themselves as loving new technology and being amongst the first to use it, and only a few (less than 1% for Saudi and less than 3% for Gulf State participants) considered themselves sceptical. Administrative staff were also generally enthusiastic about new technology although less so that faculty members, with around 30% from each group very enthusiastic, and with 7.5% of Saudis and a surprising 11.5% of Gulf Stage staff indicating that they were sceptical about new technologies.

Table 4-22 Participants' attitudes to adopting new technologies

	Students		Faculty members		Administrative staff	
	Saudi	Gulf States	Saudi	Gulf States	Saudi	Gulf States
I am sceptical of new technologies and use them only when I have to	13.7%	10.6%	.9%	2.9%	7.4%	11.5%
I am usually one of the last people I know to use new technologies	12.9%	7.3%	2.8%	5.7%	7.4%	0.0%
I usually use new technologies when most people I know do	36.1%	36.6%	34.6%	28.6%	29.5%	42.3%
I like new technologies and use them before most people I know	18.0%	17.9%	19.6%	22.9%	24.2%	15.4%
I love new technologies and am among the first to experiment with and use them	19.3%	27.6%	42.1%	40.0%	31.6%	30.8%

These results highlight the difference between Saudi and Gulf States students. Gulf States students have a better attitude to adopting new technologies which help them to participate in ICT-related activities and especially in their studies. The attitude of faculty and staff members in Saudi Arabia and the Gulf States is virtually the same when adopting new technology.

Table 4-23 describes students' and faculty members' preferences about use of technology in classes in both regions. The table shows that students in both Saudi universities and Gulf State universities are only mildly enthusiastic about ICT in classes, with most in both groups indicating that they would prefer classes that make only moderate or limited use of technology features. Faculty members in both groups are more positive about use of the technology, with most indicating that they prefer moderate to extensive use in class teaching. However, both students and faculty members indicate that they are not strongly in favour of classes that are delivered entirely on-line.

Table 4-23 Participants' preferences regarding the use of technology the classroom

	Students		Faculty members	
	Saudi	Gulf States	Saudi	Gulf States
I prefer taking classes that use no information technology	19.1%	13.8%	13.1%	5.7%
I prefer taking classes that use limited technology features	24.0%	20.3%	16.8%	5.7%
I prefer taking classes that use a moderate level of technology	28.4%	29.3%	26.2%	40.0%
I prefer taking classes that use technology extensively	16.2%	26.8%	33.6%	45.7%
I prefer taking classes that are delivered entirely "on-line" with no required face-to-face interactions	12.4%	9.8%	10.3%	2.9%

4.3.4.1 Open-Ended Questions

In responding to the open-ended question on ICT in teaching, six Saudi students pointed out the importance of faculty members encouraging and motivating students to use ICT in their studies, and three Saudi faculty members think that resistance to change and lack of faculty members' willingness to embrace it is a big issue that

effectively undermines use of ICT. In relation to increasing the use of ICT at the university, 6 Saudi faculty members' noted the importance of motivation by incentive even if staff are foreign, and 3 Saudis highlighted the need to motivate students to use university services in their studies such as submitting assignments, contacting or making online enquiries such as through email. In relation to 8 Saudi staff thought that the university should offer support and motivation via incentive if ICT is to be used in the workplace effectively. Finally, three Saudi administrative staff stated that university decision-makers should motivate their staff to use electronic channels when communicating with other staff.

4.4 Discussion and Findings

The data indicates that compared to other Gulf State universities, Saudi Arabian universities experience many problems in effectively implementing and using ICT. Using surveys, we obtained data from students, faculty members, and administrative staff in 10 Saudi and 5 Gulf States universities. The data suggests that the latter receive considerably more benefit from ICT than the former, despite all the countries concerned having similar budgets, sharing similar cultures and having good infrastructure.

Stakeholders in the Gulf States universities use ICT more frequently and this may be due to more proactive university ICT policies, support from university heads and decision-makers, and people simply being used to working with such systems. This use helps them to understand the benefits of ICT and its applicability to their duties.

As a result of current problems, many Saudi universities still utilise paper-based processes that cause delays and lead to other difficulties. For example, faculty members lose much time in their teaching duties such as marking, preparing lectures, and administrative work, and they experience communication problems as well. Moreover, students endure many problems with enrolments, contact with staff, familiarity with technology and other issues. Finally, many administrative personnel lack the skills to deal with technical issues and their qualifications for using ICT are low or non-existent. It is evident that as a group Saudi universities administrative staff members lack adequate awareness about technology and its role in their workplace.

From the survey data results we identified three main problem areas and associated challenges that are preventing effective use of ICT in Saudi universities. This section describes the main problems, which may help to focus on solving this issue.

4.4.1 Poor ICT Infrastructure

Data collected in the survey shows that many people who work and study at the Saudi universities do not have their own computer devices and some cannot bring them to the institution. For this reason the universities must make computers available to all students, faculty members and staff so that they can do their work at the university and do not need to go to home to do it.

Many newly established Saudi universities lack necessary ICT infrastructure, which should include student computer laptops, access to desktop devices and office-based Internet, Wi-Fi Internet connections, smart classrooms, PCs for staff, electronic educational, communicational and administrative services and other software systems (Altameem, 2013; Al Gamdi & Samarji, 2016). Some new universities have acquired infrastructure as a consequence of merging with an existing university, but even then managing these problems is still critical, and leadership is frequently lacking in the ICT department. Good ICT management is especially challenging for universities with several campus sites; some universities have more than 20 campuses spread across different cities, which requires large budget outlays to keep the infrastructure functioning.

According to the survey results and observations made by the researcher when collecting data, many universities in Saudi Arabia lack adequate ICT resources, mainly in the form of hardware and software. Many faculty members point out that they do not have computers in their office and if they do so, they do not have access to the Internet. Having the basic hardware tools is vital to any education institution. Also, even if there is a good system and e-services in the university, faculty and staff member still cannot access them because their institution does not offer them PCs and Internet connection. Even if universities have good infrastructure on their main campuses, many have problems in remote campuses because they do not have enough PCs and they do not have Internet networks.

Observations conducted by the researcher at the universities participating in this research indicate that many Saudi universities as well are not equipped with

laboratories which students can use for their practical tasks, and these rooms also lack Internet access and if it is available it is often not reliable or not fast enough for students to use, or there are only a few PCs. Furthermore the cost of ICT services and tools is expensive, especially as students often need support when they are using the technology. This level of service can is difficult to provide and in most cases it has to be paid for by the parents. Many Saudi universities do not offer computers or an Internet connection to students and only want faculty members to have indirect access to such ICT devices. Many universities in Saudi Arabia do not have adequate software systems such as email, learning management system and enrolment systems. When software is available it will be available mostly in the main campuses. Furthermore, it is not always of good quality and this undermines students', lecturers' and staff's skill sets.

Although adequate technical support is essential to providing good ICT services, it is evident that some campuses do not have such a special department for support and if they do have, there are not enough technical staff being employed or they are not qualified to deal with problems (Al Gamdi & Samarji, 2016). These issues make an impact on other scenarios in the universities, such as lack of funding, or old infrastructure which needs to be updated to be effective.

The discussion presented in this section demonstrates that there is a difference in the quality of ICT infrastructure as perceived by the faculty members, administrative staff and students of Saudi Arabian universities on one hand, and the Gulf States universities on the other. When the results are viewed in light of the Saudi universities' recent decision to promote ICT, then the level of interest, nature of use and ability of these respondents seem to fall short of the requirements for developing via ICT infrastructure. The respondents depend on their universities' capacity to offer and manage ICT infrastructure and how the universities encourage their stakeholders to use it. The Gulf States universities' stakeholders are much more amenable to electronic services because they have the infrastructure in place. Their institutions encourage and emphasise ICT's place in teaching, learning and administrative activities.

The data also suggests that even where Saudi universities have good infrastructure or networking capability, the problem remains that electronic services and especially education services are not available or not of good quality. Universities provide many

features to support education for some sections of the university, but they also need to pay attention to education systems because the main reason for having universities is to provide education and universities have to take care that all relevant services are offered. Too often, other failing parts of the university system discourage stakeholders from utilising them because there is a gap between expectations and services. For example some businesses execute their procedures electronically and/or manually. Universities have to offer a high quality ICT system that covers all aspects and functions so that faculty members and their students are encouraged to use it. The institutions should also link students and faculty members to other campuses so that there is more participation in the university education system.

The results of this section point to some issues on which further research is required. There is a need to measure ICT infrastructure and how it affects faculty, staff and students in a more substantial way so that re-configured ICT infrastructure is more effective. In other words, an ICT infrastructure needs to be investigated in terms of the various academic university populations. Prior to that, students' use of the services should be examined. The ICT infrastructure offered by the universities should be evaluated in terms of its effectiveness.

4.4.2 Low ICT Skills

Survey data indicates that Saudi university personnel often lack skills in utilising ICT software and hardware, largely because they have not been properly trained. Even where faculty members and other staff have good ICT skills, the poor skills of co-workers cause delays and inefficiency because the large gulf between skilled and unskilled colleagues results in duplicated work and communication difficulties. Furthermore, the lack of ICT skills in teaching staff has a 'knock on' effect for students who in turn lack skills because staff do not encourage them to use ICT in their studies or other administrative tasks.

Every university employee should have at least a moderate level of skill in ICT and the ability to improve their technical expertise via university training courses or workshops or by self-learning. Because of their age, many Saudi faculty and staff members did not learn much about ICT when they were in school or university. Many university employees have had more than 20 years' experience before ICT became important in the university sector, and the lack of effective training means many of

them find it difficult to improve their computer skills (Al-Oteawi, 2002). In addition, many faculty and staff members do not have the motivation to improve (Alarabi, 2013). When compared with similar staff in Gulf State universities, many faculty members and administrative staff in Saudi Arabia's universities have less ICT skills, which inhibits using ICT tools effectively, if at all. Moreover, many Saudi universities' faculty members and administrative staff do not receive high quality training to help them develop their knowledge and workplace expertise, although some have the opportunity to receive training inside or outside their university in the ICT field.

The first and most important reason for poor ICT skills in Saudi university staff is that there are not many specialist organisations that can help university staff development, especially for universities that are not in the main cities (Al Gamdi & Samarji, 2016). Since most of the new universities are not in the major cities or towns, faculty and staff members have to travel far to attend any courses or workshops, which discourages attendance. Saudi Arabia has only a small number of government departments and even then they do not offer much training to faculty staff and are in any case usually located in the major cities (Al-Asmari & Rabb Khan, 2014). Finally, even where training opportunities are available, faculty members often cannot attend a training course because of an already overloaded teaching timetable. Moreover, universities often do not provide financial support to attend training or pay for accommodation or transportation. The situation for students is often no better, with many students not receiving any support or training that could help them use university ICT systems. New students need this kind of orientation and it should be provided when they enter the world of the university.

The results of this section point to some issues on which further research is required. There is a need to measure ICT skills and how it affects faculty, staff and students in a more substantial way so can offer training packages for various groups. It is also necessary to investigate the level of information evaluation skills that users have and teach them the importance of selecting the appropriate services and websites for teaching, learning, research and administration. There is a discrepancy between faculty members' expectations and skills and the system services being offered, and this gap should be filled by training and education sessions, and ICT support services.

4.4.3 Lack of Motivation

Although the survey questions did not explicitly ask questions about the matter, data from several sources led us to identify lack of motivation as one of the main barriers to effective ICT use in Saudi universities. Answers to the questions in Section 4 of the survey, which asked participants for their opinions on various aspects of the use of ICT, strongly suggested that motivation was an underlying problem. In particular, for those participants who completed the open-ended question asking for "any other comments", many responses directly or indirectly identified lack of motivation as one of the reasons for low or ineffective use. In addition, informal comments received from both participants and colleagues during data collection trips reinforced the point. Finally, previous studies about attitudes of Saudi ICT users (Alarabi, 2013) have also identified motivation as an important issue.

There are probably several reasons why Saudi university staff do not feel motivated to engage with available ICT technologies or systems. Often, faculty members and administrative staff do not use ICT in their work because they see such work as the responsibility of others, or because they see a lack of guidance from university decision-makers or policy-makers. They see the workplace as lacking the kind of support that would encourage them to use new technology or update their skills. Poor motivation in employees and poor local work culture can have serious effects on improving skills and using ICT in the workplace (Al Gamdi & Samarji, 2016). For example, a common problem is that faculty members with high teaching loads are not motivated to spend additional time in acquiring new ICT skills, especially if they see their colleagues as having smaller teaching loads.

Universities in Saudi Arabia are government-run organisations and the decisions their ruling bodies make require the backing of the Ministry of Education. For this reason the motivation of administrators in the public sector is not as high as those working in the private sector (Al Doghan & Albar 2015). The results of the surveys indicate that administrators are not inclined to improve how their university functions due to a lack of motivation, which then affects faculty members as well (Alarabi, 2013). For example, administrative staff in Saudi universities do not use email effectively to help them in their work which means faculty members cannot deal with them through email. Also, bureaucracy in the Saudi Arabian government system tends to frustrate any improvement that administrators want to do in their universities (Ismail et al., 2016).

Many faculty members lose their motivation over time because the university environment is not conducive to taking the initiative to improve work or study practices (Almalki, 2011).

The issue of resistance to change is one of the most important reasons that any organisation must overcome, especially when changing from a manual to an automated system (Al Gamdi & Samarji, 2016; Omari, 2013). This problem is typical for older people who have already achieved a degree of success in doing things in a particular way, and who may develop a negative attitude or resistance to change from the fear of having to change their skills set. Other problems arise if faculty and staff members do not think that ICT is useful because they have no clear idea of the benefits to them or to their job. Resistance to change is particularly evident in the older universities where staff members are older and resist using ICT in learning, teaching and office duties.

Finally, the previously cited problem of low skills due to lack of training and poor infrastructure gives rise to frustration for faculty and staff members, which can lead to a lack of motivation. University decision-makers should encourage and motivate faculty members and administrative staff to increase their use of ICT services and infrastructure.

4.4.4 Other Barriers

The data also identifies barriers that are less important but are still noticeable, or are linked to other barriers as a consequence or cause. Many Saudi faculty members have an overloaded timetable (Al-Shammari & Higgins, 2015) because of a lack of suitable teaching staff. Some universities seek foreign academics to work for them, but this is not enough to minimise the overload (Al-Ghamdi & Tight, 2013). Because of the conditions of some of these university campuses and the cities they are located in, it is difficult to recruit good and well qualified people on a contract basis. This problem undermines lecturers' ability to improve and work at their best (Smith & Abouammoh, 2013). Also, universities generally do not provide sufficient technical support staff to help faculty members overcome difficulties with ICT, or enough teaching support for activities such as converting their lecture materials into electronic format or locating resources about ICT (Al-Shammari & Higgins, 2015).

Sometimes, even if a faculty member has a good ICT background, colleagues' negative views about ICT in hinder motivation and reinforce the general reluctance to utilise

ICT. Moreover, Saudi families' negative views about technology, and especially in the context of use by females, is another barrier that must be overcome. Many Saudi families who live in rural areas have a negative attitude towards technology or anything that is new (Al Alhareth et al., 2013). Others do not have a good understanding of new technology and what it aims to do or how it works and for this reason many Saudi families do not trust computers. Some families do not accept Internet access in their home because they cannot control what their children see or read. This situation is particularly difficult when there are girls in the family (Al Alhareth, 2014).

These issues reflect the fact that conservative thinking and resistance to change are common in Saudi Arabia and act to undermine attempts to update the tertiary education system.

4.5 Summary

This chapter began with an explanation of the methodology used in this phase to explore the views, experiences and problems that students, faculty members and administrative staff in the Gulf State universities and Saudi Arabia have regarding ICT. Quantitative methods were used to systematically collect and analyse the necessary data to meet the research study's aims. The research process, including survey questions, data collection, translations and pilot study, was subjected to validity and reliability testing. Appropriate research approvals were obtained from Flinders University and SACM, and data was collected from students, faculty members, and administrative staff in 10 Saudi and 5 Gulf State universities. The data was analysed to identify barriers that were preventing effective use of ICT in Saudi universities. Key barriers are poor ICT infrastructure, low ICT skills, and lack of staff motivation.

The relationships between barriers are multifaceted at different levels. Some issues such as lack of ICT skills seem to be closely related to lack of effective training. University level barriers represented by poor ICT infrastructure seem to be more significant than others. Those at the university level affect the others, for example the lack of motivation, has a 'knock on' effect for institutions' ICT and the ability of lecturers to do their jobs more effectively. Better motivation from those who govern or administer the university will help to improve the ICT infrastructure. Another example of the relationship between the major barriers and other issues is the lack of

effective training in improving and consolidating ICT skills for both faculty members and students. Lack of time for faculty members does not motivate their desire to improve their skills by attending training courses or by themselves. They will not use ICT in their work activities because it will simply take too much time.

It is evident that faculty members' issues impact on each other and then affect the problems that students encounter. Improving ICT skills requires that faculty members have the time available and the motivation to improve their teaching skills and experiences. Faculty members whose universities give them time to do so can and will be more creative and innovative than people who do not have sufficient time.

CHAPTER 5 PROBLEMS AND SOLUTION STRATEGIES

5.1 Introduction

The barriers identified in the previous chapter were used to conduct an in-depth analysis and strategies to overcome these barriers were sought from a wide range of contexts, including other education systems, other users of ICT in Saudi Arabia and elsewhere, and institutions in Saudi Arabia that have already found solutions or are in the process of trialling them. Where possible, evidence was gathered as to the success or otherwise of those strategies that have been used elsewhere. Where a barrier was specific to the Saudi environment, solutions were sought by combining and adapting ideas from other contexts (Croucher et al., 2013; Coyle, 2014; Xie et al., 2014; Mohammad, 2015). The outcome of this phase of the research was an interim report identifying the barriers to effective ICT use in Saudi Universities and laying out options for their solution.

The full text of the interim report appears in Appendix Q and R; the following extract is taken from the introduction:

> *Compared with the other Gulf State universities, Saudi Arabian institutions experience many problems in effectively implementing and using ICT. Using surveys, we obtained data from students, faculty members, and administrative staff in 10 Saudi universities and 5 Gulf States universities. The data shows that the Gulf States universities get considerably more benefit from ICT than the Saudi institutions, despite all the countries concerned having similar budgets, sharing similar cultures and having good infrastructure.*
>
> *Currently, many Saudi universities still utilise paper-based processes that cause delays and lead to other difficulties. For example, faculty members lose much time in executing teaching duties such as marking, preparing lectures, and administrative work, and they experience communication problems as well. Moreover, students endure many problems with enrolments, contact with staff, unfamiliarity with technology and other issues. Finally, administrative personnel lack skills to deal with technological issues and their qualifications for using ICT are low or non-existent. Also, Saudi universities' staff suffer from the lack of awareness and not being serious about their workplace duties and obligations.*
>
> *Some problems emerge as a consequence of other issues such as lack of motivation. It is a consequence of many problems in universities such as lack*

of ICT infrastructure, lack of training, lack of motivation and lack of leadership. This report describes the main problems identified and proposes potential solutions. The emphasis is on solutions that are practical to implement in the affected universities. The two main types of solutions are cultural and technical in character. It is very important to implement solutions so that the maximum benefit is obtained for all parties involved. This research also draws on the results of previous studies.

This chapter presents the methodology employed in this phase of the research and explains the design and methods employed to explore the solutions for ICT problems arising in the Saudi Arabian university sector. The rest of the chapter is organised into three main sections in line with the structure of the report, with each section discussing how the report conclusions and recommendations were arrived at. First, there is a brief discussion about the main problems identified in phase 1. Then, the research will look at the main stakeholders in the Saudi university environment and how they are involved in the use of ICT. Finally, the chapter ends with a discussion of the proposed solutions which may help Saudi universities.

5.2 Method

For this phase of the research, we have taken a systematic and focused approach to gathering relevant information on potential solutions to barriers that affect ICT usage in Saudi universities. We do not aim to uncover all the problems, but to select the most significant and categorise them in three types so that relevant solutions can be identified. Systematic review guidelines recommend the following steps (Beecham et al., 2008):

1. Identify the need for a systematic literature review
2. Formulate review research question(s)
3. Carry out a search for relevant studies
4. Assess and record the quality of included studies
5. Classify data needed to answer the research question(s)
6. Extract data from each included study
7. Summarise and synthesise study results (meta-analysis)
8. Interpret results to determine their applicability
9. Write up the study as a report

This study conformed largely to these guidelines, with some modifications which are discussed in more detail below.

5.2.1 Need for a Report

The barriers in the previous chapter were subjected to an in-depth investigation. We have focused on survey results that concern problems encountered by faculty, administration staff and students when using ICT. We have examined the quantitative and qualitative results regarding these barriers to generate effective solutions to overcoming them.

5.2.2 Questions and Objectives

The research questions addressed in this phase of the research were to:

- Q 2.1: What are the main barriers that affect students, faculty members and staff using ICT in Saudi Arabian universities?
- Q 2.2: Who are the main stakeholders who may help to implement solutions to overcome the barriers?
- Q 2.3: What solutions for using ICT in Saudi Arabian universities can help overcome the barriers?

5.2.3 Search for Relevant Studies

We investigated several search engines and databases to ensure we captured a wide variety of papers on the subject of ICT barriers and their solutions. The search produced many references regarding ICT barriers in universities and the outcome was a variety in topics. The first category examined the barriers affecting government use of ICT. The second category focused on the barriers affecting the utilisation of ICT in education and schools. The third category focused on organisational barriers affecting use of ICT. The final category looked at barriers that stop universities using ICT effectively. Some papers focused on the solutions regarding these barriers but not many concentrated on the university or education sector. We found that some of these papers did not match our inclusion criteria.

5.2.4 Report Development

The main goal of this phase was to investigate solutions for important barriers that affect Saudi universities so that they can employ ICT more effectively. The outcome

of this chapter was an interim report called “Effective Use of ICT in Saudi Universities: Problems and solution strategies” (Appendix Q). This report consists of three sections. The first section identified three important barriers which affect Saudi universities. The second section identified the main stakeholders in Saudi universities which may help to implement recommendations or solve these problems. The third section had the recommended solutions, which we categorized into two types: cultural solutions such as overcoming users’ habits and attitude, which could be implemented by non-technical departments and staff, and technical solutions, which focus on the solutions which should be implemented by IT departments and experts in the ICT field.

The report was written using clear and non-technical language, and was aimed at both technical and non-technical members of faculty and staff in Saudi universities. Drafts were reviewed by a proof-reader and the research supervisor, and the contents were discussed with other IT PhD students at Flinders University. The final version was translated into Arabic and reviewed by specialists and experts in the subject being investigated. Three Saudi Arabian PhD students at Flinders University who were fluent English speakers were asked to read and comment on the Arabic translation of the report. Based on their comments and suggestions, some statements were modified or clarified. The report was also reviewed by an ICT specialist in a Saudi university.

5.3 Problems and Challenges

Based on the survey data from phase 1 of the research, which is discussed in detail in Section 4.4, the report identified three main problem areas and associated challenges that are preventing the effective use of ICT in Saudi universities.

The report described the problems as follows:

> ***Poor Infrastructure***
>
> *Many newly established universities lack the necessary ICT infrastructure, which should incorporate student computer laptops, access to desktop devices and office-based Internet, Wi-Fi Internet connections, smart classrooms, PCs for staff, and other software devices. Some new universities have acquired infrastructure as a consequence of merging with an existing university, but even then managing these problems is still critical, and leadership is frequently lacking in the IT department. Good ICT management is especially challenging for universities spread across several campuses. Some universities have more than 20 campuses spread across different cities, which requires large budget outlays to keep the infrastructure functioning.*

Low Skills

University personnel often lack skills in utilising ICT software and hardware, largely because of a shortage or non-existence of training. Even where faculty members and other staff have good ICT skills, the poor expertise of co-workers causes delays and inefficiency because the large gulf between skilled and unskilled colleagues results in duplicated work and communication difficulties. Furthermore, the lack of ICT skills in teaching staff has a 'knock on' effect for students who in turn lack skills because staff do not encourage them to use ICT in their studies or other administrative tasks.

Lack of Motivation

Many staff do not feel motivated to engage with available ICT technologies or systems. Often, faculty members and administrative staff do not use ICT in their work because they see such work as the responsibility of others, or because they sense a lack of guidance from university decision-makers or policy-makers. They perceive the workplace as lacking the kind of support that would encourage them to use new technology or update their skills. Poor motivation in employees and poor local work culture or 'work ethic' can seriously impact on improving skills and using ICT in the workplace. For example, a common problem is that faculty members with high teaching loads are not motivated to spend additional time acquiring new ICT skills, especially if they see their colleagues as having smaller teaching loads.

5.4 Stakeholders

Based on literature and data collection, the report pointed out the important role of key stakeholders in implementing solution strategies:

Solutions to these problems must be linked to university policies and practices in order to be effective (Ziaie, 2013). The most important people who can help with these problems are university managers and directors who have the authority and responsibility for implementing ICT, technical staff and external partners who will implement and support the ICT infrastructure, and of course the teachers and administrative staff who will use ICT in their day-to-day work.

5.4.1 Decision-Makers

In government and non-government institutions, many studies point out that decision-makers have the authority to change the institutions' environments and system (Abu-Al-Aish, 2014; Alshehri, 2012; AlShihi, 2006; Ingutia-Oyieke, 2008). In developing countries, the work of decision-makers is particularly difficulty because they have to

take into account many factors such as culture, lack of resources, lack of qualified staff, etc. (Ashrafi & Murtaza, 2008; Khan et al., 2012).

Report recommendation:

> *Decision-makers should choose a qualified and highly experienced ICT team that can develop both basic and more advanced ICT solutions. The most difficult task is changing from an old system to a new one and this means implementing change at all levels in the university. IT leaders should ensure that staff are appropriately trained to deal with hardware and software issues and related developments. Such decision-makers include university presidents, chancellors and vice-chancellors, directors, faculty or departmental heads, deans and senior administrative staff.*

5.4.2 Technical Support

In the university context it is very important to support users all day and every day. In addition to face-to-face support, technical support should include information on the website about common questions and answers (FAQs), and flash services and videos for specific services. Also, users should be informed about any scheduled maintenance required for systems during work hours or non-work hours (Burrell, 2014; Khaled,2014; Xie et al., 2014).

Report recommendation:

> *IT departments have many duties and they will have to replan their functions using qualified and experienced people. ICT infrastructure will have to be reconfigured so that it is used in a more effective and efficient way. Moreover, the Internet should be made available everywhere with the appropriate restrictions in place. Good technical support will help users to use services in all campuses, schools, departments, libraries and labs Technical support includes IT departmental staff, IT staff in the schools and IT staff in administrative departments.*

5.4.3 Faculty Members

Faculty members are the most important and significant stakeholders because they are entrusted with the responsibility of transforming students into future workers and professionals (Naderi et al., 2014; Shukla & Singh, 2015). Faculty members have a strong impact on students' attitudes and their education and learning experiences (Brown, 2015).

Report recommendation:

> *Faculty teachers should be more active in using ICT much more effectively. They must encourage students to use technology such as email for contact, access to electronic materials, submit assignments electronically, and learn about other features of the online learning management system. Teachers include full-time and part-time faculty members and training centre staff.*

5.4.4 Administration Staff

Universities cannot achieve their goals without administrative staff. It is very important to attract competent people to work in the university and motivate them and evaluate their abilities and productivity (Jung & Shin, 2015). Using ICT in their work will help administrative staff to improve their performance and expertise in doing university-level work. This change will positively affect the other stakeholders in university (Khan et al., 2012; Shaikh & Khoja, 2011).

Report recommendation:

> *Administrative staff should understand the advantages of working electronically compared to paper-based systems. Administrators include all staff working at a university, such as full-time and part-time employees, and contract workers.*

5.5 Solution Strategies

Based on the data collection results and the extant literature, this section considers solutions for the ICT-related problems identified in the report. It should be noted that there are certain prerequisites that should be met, before any measures or solutions can prove effective. The most important prerequisite is that ICT should not threaten the power or authority of the highest authorities and leaders of the universities (Ziaie, 2013). Without the support of the decision-makers, any effort to facilitate and deploy ICT would be ineffective. Certain social and cultural facts and realities should not be ignored (Campanella et al., 2008). Otherwise the introduced technologies or features could prove to be harmful or used in an inefficient manner and not in the way as was originally intended (Ziaie, 2013).

From the report:

> *We propose solution strategies that can be categorised as either cultural or technical in character. Neither type of solution can function without the other. Without technical support, the benefits of ICT are unavailable. Without cultural support, the money spent on implementing ICT is likely to be wasted.*

5.5.1 Cultural Solutions

Saudi cultural values will affect the lives of the country's people and how they live and work. The Saudi government recognises this and has consequently introduced ICT in the education system to its citizens in the hope of maximising its advantages (Abu Nadi, 2012). This introduction should be supported by solutions to help with the implementation process. Cultural solutions are very important because they could overcome factors that may affect technology usage and avoid the stigma of rejection (Alkhalaf, 2013). This kind of solution is very important to implement if time and money are to be spent well and not wasted. Cultural solutions will help to solve the problems of using ICT with particular reference to the issue of motivation (Noll, Beecham & Richardson, 2010). This solution will be easier to execute than others due to universities having younger staff who have worked in overseas universities where ICT is employed extensively. The most important cultural solutions are outlined below.

5.5.1.1 Attractive Incentives

Motivation is one of the important factors which can help to solve any problem (Croucher et al., 2013). In Saudi universities, staff need to be encouraged to use ICT in their workplace duties (Abu Nadi, 2012). First of all, universities have to provide all the requirements that are needed to apply ICT, including good infrastructure, policies and rules and other requirements. Otherwise frustrations will emerge and compromise people's motivation and abilities (Algahtani, 2011). In addition, universities can motivate their staff in many ways, such as providing training courses, upgrading people's duties or positions, spreading the work and teaching loads, and providing public recognition to the best staff (Al-Alwani, 2005; Coyle, 2014).

One of the most notable aspects of Saudi culture is the need to have an incentive to do something and this should apply to using ICT in the workplace (Al Gamdi & Samarji, 2016; Almalki, 2011). This kind of motivation will encourage staff to use ICT in their duties and in turn encourage other users to adopt it, especially students (Abu-Al-Aish, 2014). This kind of motivation requires the support of university leaders and managers to ensure institutional goals are achieved. Managers have to control these incentives and support them through policies, rules and regulations (Algahtani, 2011). It is also very important that incentives do not harm university budgets or lead to any corruption

due to abuses of eligibility rules or other kinds of procedures. Moreover, universities will have to monitor their staff daily if such an incentive scheme is to work (Naarmala, 2009).

Report recommendation:

> *Universities should boost staff motivation by providing attractive incentives for improving workplace practices with special reference to ICT. Universities receive large government budgets and the money should be spent on training to learn incentive-related skills. This means in effect encouraging staff to improve their workplace attitudes and skills through the process of self-learning. Staff must be encouraged as much as possible to attend training courses and improve their sense of motivation and how to complete procedures, processes, routines, etc. that are ICT-based. Incentives will have to be evaluated by university decision-makers, managers and leaders, etc., in terms of staff members' age, qualifications, experience and what will be required in the future.*

5.5.1.2 Up-to-Date Policies and Rules

It is very important for organisations to have policies and rules that drive and control every internal or external process. The most significant policy regarding using ICT effectively in Saudi universities concerns the approach taken to security, staff and students' usage of technology and may also apply to other issues, for example; sexual harassment, privacy, etc. (Peeraer & Van Petegem, 2012; White, 2013).

These policies and regulations should be developed by the experts working in ICT and who can access advice provided by committees or expert bodies. Policies and rules have to be easy to understand and clear to all staff, students and technical and non-technical personnel (Campbell, 2012; Peeraer & Van Petegem, 2012). Rapid advances in the ICT industry means that policy-makers have to ensure their rules are current and up-to-date (Meyer, 2002). Moreover, organisations must have policies that work and are accessible to staff and students through many channels such as the university website, course materials, emails, etc. In addition, university managers and leaders need to enforce these rules seriously and set penalties if they are not complied with (Macfarlane, 2013; White, 2013).

Saudi Arabia's higher education policies and practices, especially those concerning ICT, have to be reviewed to ensure their relevance to the needs and aspirations of people working and studying in the tertiary sector.

Report recommendation:

> *Government and university decision-makers should update all mission statements, policies and rules concerning ICT and where and how it is used. Universities should staff these policies and rules and they should be worded in ways that give them the incentive to improve their IT skills. Penalties should be introduced if staff do not attain the bare minimum of ICT skills such as using email, organising desktop spaces, online folders, etc. Furthermore university authorities should monitor staff usage and the specified minimum ICT services that are required in teaching and administrative work. This will be fairly easy because most staff are young and faculty members have worked or studied in overseas universities, such as in the USA, UK and Australia where ICT usage is routine. Resistance against these policies and rules may emerge from older staff who should be given time to adjust to the newer policies and procedures.*

5.5.2 Technical Solutions

ICT tools are used effectively to solve many problems in organisations such as effective use of time, training, technical support and availability, and keeping costs down. Many ICT tools can support cultural solutions so that they are more affective (Bonk, 2002; Chatterjee & Nath, 2015). In this section technical solutions are discussed in terms of their effect on barriers and supporting cultural solutions.

5.5.2.1 Comprehensive Usage Monitoring

The ever-increasing exploitation of technology in the workplace has enabled decision-makers to see and measure nearly every aspect of university computer application (Nord, McCubbins, & Nord, 2006). Many researchers point out that offering technology in the organisation is not enough to obtain the benefits. Many other factors have to support the infrastructure for it to be more effective (Duane & Finnegan, 2004; Wagner et al., 2005). One of the most useful solutions is usage monitoring. University managers can monitor users' actions to help and support them in their decisions and duties. For example a faculty members' interaction with students could be monitored to assess the effectiveness of online studying or learning activities (Wagner et al., 2005).

Monitoring software refers to measuring and managing computer systems, displays, disks, software, email, Web and Internet access and other computer-related activities. The software can automatically archive all collected information into a corporate

network server for review at a later time. Many capabilities of typical monitoring software are now readily available on the market (Nord et al., 2006).

There are many advantages for continuous monitoring of users' ICT access. Firstly, there are obvious benefits for workplace productivity. This benefit will help university budgets and reduce time spent on maintenance and support due to systems disruptions (Mohammad, 2015). Furthermore e-monitoring is a very important support system for implementing cultural solutions as mentioned previously. For example, it will help to protect users from any harm emerging from inside or outside the organisation, and it will help managers and leaders to measure the effectiveness of incentive through statistics. Also, it helps in the application of policies and rules concerning the use of ICT (Kiser, Porter, & Vequist, 2012).

On the other hand, many studies note the problems caused by this monitoring in terms of ethical dilemmas. Monitoring ICT users' access to the technology means an invasion of privacy, which can discourage use. This is a critical issue for females in Saudi universities due to the history of their segregation in society. Universities have to develop strategies where the monitoring system is informative but at the same time protects people's privacy (Bassick et al., 2012; Nord et al., 2006).

Report recommendation:

> *A comprehensive ICT usage monitoring system could track staff and students' use of the technological infrastructure, which would help managers and ICT chiefs identify which sectors are not making effective use of ICT services. Information gathered by the monitoring system can be used to support cultural solutions; for example it could identify areas where incentives are not working well, or circumstances that cause policies to be ineffective. As an added benefit, the monitoring system can also serve to identify breaches of safety and security.*

5.5.2.2 High-Quality Online Training

Due to rapid developments in education-related information, Saudi universities require more qualified staff to overcome the problems that may emerge (Al-Asmari & Rabb Khan, 2014). Training such as self-learning, commercial training courses and workshops are provided by most universities. One of the best ways to develop staff skills is through an online training system due to its advantage (Rogers, 2013; Fee, 2014). E-training which resembles e-learning refers to employing computer resources as an instructional system in a training environment. It helps universities to control

training costs, increase ongoing training, reduce time wastage and make instruction more flexible (Naarmala, 2009; Ramayah, Ahmad, & Hong, 2012).

Online training needs to be of high quality and meet the needs of participants. For this reason, designing an online training system is very critical and universities have to focus on what the benefits will be. Training content should ensure that training plans are sensible and based on staff members' career development level and current role (Xie et al., 2014). University managers and leaders have to monitor the benefits of e-training. Some online training courses will be compulsory for some kinds of participants, for example faculty members accessing the LMS.

Report recommendation:

> *Online training is an easy way to develop and update skills for staff and students. Universities should offer online training courses to suit a wide range of skill levels and needs. Staff should be required to demonstrate competence in the skills needed for their situation, with regular assessments to ensure skills are up to date and the results used to direct users to the training courses appropriate to their current skill level. To be effective, courses must be designed by specialists such as those employed or contracted by ICT companies that are familiar with university requirements.*

5.5.2.3 Universal Access to ICT Infrastructure

The most important barrier, which may cause other problems to emerge, is lack of access to proper ICT infrastructure (Dhanarajan & Abeywardena, 2013). Based on literature and data collection, there is a strong relationship between effective use of ICT in the university and availability of suitable ICT infrastructure and all users' access to ICT resources. Obviously, if one stakeholder cannot access ICT resources, then he or she will not use them (Dhanarajan & Abeywardena, 2013; Gul, Arif, & Yousaf, 2013). ICT infrastructure comprises a wide range of technology resources including the Internet, telecommunication technology, digital convergence of computer technologies, electronic libraries, software applications, etc. (Walmiki & Ramakrishnegowda, 2009).

All users should have the same opportunities to enjoy access to the ICT infrastructure (Dhanarajan & Abeywardena, 2013). Universities usually have more than one campus and this causes differences to emerge in ICT infrastructure, support and resources. For example, Saudi Arabian universities have separate campuses for males and females, and many studies state that their infrastructure and support are not of the same standard

or quality; differences also occur between schools or faculties on the same campus (Al-Shehri, 2013; Al Mulhim, 2014). It is essential that all students and faculty members who use e-learning tools effectively must also have Internet connection on campus (Alkhalaf, 2013; Almalki, 2011).

Saudi Arabia is a large country and its universities already have good infrastructure in most cities and campuses, despite the costs involved (Al-Asmari & Rabb Khan, 2014). However, some universities still do not know how to deal with ICT due to lack of other support structures such as lack of usage policy, lack of professional expertise, lack of plans and strategies, lack of will among decision-makers and other factors. Saudi universities spend much of their budgets on infrastructure but this is not reflected in the resulting workplace outcomes (Al-Shehri, 2013; Algahtani, 2011; Almalki, 2011).

On the other hand, universities have to collaborate with private sector and semi-government organisations in order to improve campus infrastructure through corporate social responsibility (Ahamad Nalband & Al-Amri, 2013). For example, Internet connection is a very important telecommunications resource that creates links to the outside world. Many universities' campuses which are in rural area are suffering from a poor or non-existence Internet connection (Abu-Al-Aish, 2014; Al-Shehri, 2013). Companies working in the educational field must have good products that help support the university. Moreover, the Saudi government must facilitate and help to achieve this end (Algahtani, 2011). The Ministry of Education and universities must have a good relationship with the private sector to help them with tax concessions and to execute their corporate social responsibilities (Almalki & Williams, 2012). Also, corporate social responsibility may be one of the important key for universities to overcome this problem.

Report recommendation:

> *Universities should make ICT resources available to all staff and students. Where possible, access should be provided to all the resources that are available on the Internet. All access to university ICT infrastructure has to be monitored used according to the policies put in place. If such access is not possible or not desirable, for example in campuses that are far from the main campus or those that cannot afford universal access, a private staff-only Intranet should be implemented instead. Universal access to ICT infrastructure will encourage staff involvement in communication and collaboration, save time and reduce costs, provide access to business information and news, and facilitate on-line training and e-learning in each user's work context.*

5.6 Summary

This chapter describes the process of developing a report that recommends strategies that resolve barriers regarding effective ICT use in Saudi Arabia's university sector. This report is intended to help the decision-makers in the universities and policy-makers in the Ministry of Education. In addition, the report could be useful for other countries experiencing the same challenges in the Gulf States and other developing countries.

The next chapter describes feedback from key stakeholders regarding the proposed solution strategies. The overall goal for the project is find solutions that will improve the ICT situation in Saudi Arabian universities, and for such solutions to help other developing countries experiencing similar challenges.

CHAPTER 6 VALIDATING THE SOLUTIONS REPORT

6.1 Introduction

Phase 3 of the research involved gathering data to validate the solution strategies report by interviewing the ICT professionals and experts in Saudi Arabia's universities regarding the development of solution strategies outlined in Phase 2. This chapter consequently discusses the research methodology and its applications, and draws attention to the following main features:

- Research objectives and questions;
- Qualitative data collection;
- Sample selection;
- Data collection procedures;
- Data analysis procedures.

The remainder of the chapter presents the results of the interviews and discusses the implications of the feedback received for the report.

6.2 Process and Methodology

This section will summarise the process and methodology of this chapter and the research objectives and questions, qualitative data collection, data collection procedures and data analysis procedures. This methodology aims to validate the report which was described in the previous chapter.

6.2.1 Research Objectives and Questions

The objectives of this study were to: firstly, investigate the barriers that affect using ICT in Saudi Arabia universities to measure the effectiveness or otherwise of the proposed solution strategies identified; and secondly, investigate the solutions that impact on students, faculty members and staff when using ICT at Saudi Arabian universities. The following research questions were developed to validate these solutions and explore how they relate to each other:

Q 3.1: Can ICT solutions and strategies used in universities in other developed or developing countries be applied in Saudi Arabian universities?

Q 3.2: How should approaches that are successful elsewhere be adapted to suit the unique requirements of the Saudi Arabian education system?

6.2.2 Qualitative Data Collection

Marshall and Rossman (2014) describe qualitative research as research that is exploratory or descriptive, that assumes the value of context and setting, and that searches for a deeper understanding of participants' lived experiences and perspectives of a certain phenomenon or situation. Based on the feedback provided by participating experts, an inductive qualitative process is used to identify elements of the existing report that may need to be modified or revised in order for the report to be applied to higher education (Yin, 2011).

Interviews are recognised as a primary method of qualitative data collection (Creswell, 2013; Teddlie & Tashakkori, 2009; Wilkinson & Birmingham, 2003). Interviewing is also appropriate in gathering the perspectives and experiences of a small number of participants (Brenner, 2006). In the majority of interviews, researchers ask study participants open-ended questions regarding the topic and then record their answers (Creswell, 2013; Johnson & Christensen, 2013). Creswell (2014) stated that interviews provide useful information when you cannot directly observe participants, and they permit people to describe detailed personal information and circumstances. The interviews serve as a means to ensure the consistency of quantitative findings.

In this phase, individual interviews were an appropriate means to validate the interim solutions report described in the previous chapter by gathering data from the faculty participants and ICT experts in Saudi universities. The qualitative data collection selected for this phase was through semi-structured interviews conducted face-to-face and by email. According to Creswell (2014), interviews can be conducted face-to-face, telephone, email, or in a focus group.

Creswell explained that face-to-face interviews are widely used in research, but they are both time-consuming and expensive. In these interviews, the researcher poses open-ended questions to the participants, and there is sufficient flexibility for the interviewees to shape the flow of information (Wilkinson & Birmingham, 2003). Minichiello et al. (2008) describe the advantage of semi-structured interviews as arising from the somewhat more systematic and comprehensive format than in the informal conversational interview, while the interview's tone remains fairly conversational and informal.

In this phase, interviews were selected as the means for discovering information about an existing institution's ICT system and its application to higher education, information which is not easily derived through quantitative methods. Interviews with knowledgeable individuals are recommended as an appropriate method to explore the range of important issues (Alhussain, 2011).

6.2.3 Sample Selection

Marshall and Rossman (2014) suggest that the selection process of the target population is important with regard to the focus of investigating the current environment or contextual problem. For this research, the target population consisted of ICT experts in Saudi Arabian universities and other educational organisations. Some participants were faculty members who had a good background in ICT, for example faculty members in computer science and IT school. The study was limited to ten universities in Saudi Arabia.

Potential interview respondents were selected on the basis of their job responsibilities and knowledge of their organisation's mission or purpose (Miles, Huberman, & Saldana, 2013). The selection process ensured the inclusion of executives, department heads, managers, and line employees. In total, 35 emails were sent to selected professionals in different Saudi universities and educational organisations asking for their participation and 17 replied that they would. The interview participants came from 10 out of 24 Saudi Arabian government universities listed on the Ministry of Education's website as shown in Table 6-1. Most of them are emerging universities that are either completely new institutions or those that consist of several campuses.

Table 6-1 The distribution of interview participants

	Name of University	#
1	Majmaah University	2
2	University of Dammam	1
3	Um Alqura University	1
4	King Abdulaziz University	1
5	Qassim University	3
6	Shaqra University	1
7	Islamic University of Madinah	1
8	Al Jouf University	2
9	Tabuk University	4
10	Taif University	1
Total		17

Of the participants there are only two non-Saudi citizens but they are native Arabic speakers. All the participants were between 30 and 45 years of age and were highly educated; 8 of them had a PhD, 6 had a Masters degree and the remainder had a Bachelor degree. All were specialists in IS, IT, E-learning and computer sciences, with experiences in using ICT in using e-learning and ICT in their universities or during their Masters or PhD overseas study. Such experience would enable them to detect impreciseness or ambiguity in interview questions or the report's contents, and identify issues or problems with the report. Participants worked in different regions and were of both genders (3 out of 17 were female), and occupied various positions in the universities.

While preparing for the interviews, there was no information concerning women who have or had a deanship or were employed in a department of information technology, e-learning or distance education. While there is a female-only university and there is a deanship for e-learning and website, no information was available about staff and how they could be contacted. Similarly, it was difficult to identify suitably qualified people in universities in the border areas or small cities. Most professionals and qualified IT people work in the main cities in Saudi Arabia for lifestyle, salary and convenience reasons, and the benefits accrued are usually the same as those in government institutions. Moreover, many universities' websites do not include all the information about a department's staff while others do not have any information at all. These challenges led to the relatively small number of participants contributing to this solutions strategies report.

6.2.3.1 Human Subjects' Committee Approval

A request to conduct this phase of the research was submitted to the Social & Behavioural Research Ethics Committee at Flinders University. The project application was reviewed and approval was granted to begin collecting the research data (Appendix N). The study followed the model of social research and the ethical and moral matters related to it (Hall & Hall, 2004; Louis et al., 2007). Accordingly, for this study, the researcher received such permission from all interview participants. In addition the participants' Information Sheet informed them about their rights, and that they had the option to reject the invitation or withdraw at any time. Also, the study objectives were explained to the participants with what they would be asked to do in terms of being interviewed.

6.2.3.2 Translation from English into Arabic

After the report and the interview questions were approved by the supervisor, the researcher started the translation process. Because all of the participants in this study are native Arabic speakers, the researcher had to translate the English version of the report and interview outline and main questions into Arabic using a panel of experts. The documents were translated firstly by the researcher and a PhD student at Flinders University who is specialising in Information Technology and who speaks and writes both Arabic and English. The translated documents were then given to two specialists in both Arabic and English, one who specialises in English linguistics and the other in English literature. Both were asked to check the Arabic version against the English version. There were no significant differences between the two versions. The Arabic translations were then given to a fluent Arabic teacher to compile the final drafts, which were given to 2 native Arabic speakers who were asked to read the items carefully. They made some suggestions to improve the report and the researcher modified the document based on their suggestions.

The final draft of the Arabic documents (Appendices R and T) was reviewed again by a fluent English teacher specialising in teaching English as a second language in order to confirm the translation. He stated that the interview questions were clear and understandable. The process of translation is an exacting one due to the different cultural demands of each language group in addition to the technical task of finding the correct match.

6.2.4 Data Collection Procedures

Before the interviews commenced, a formal invitation was sent to each faculty member and ICT expert in Saudi Arabia during early 2014, including the deans and heads of IT departments or computer schools and the deans and heads of e-learning departments (Appendices O and P). Members of the target population who received the invitation were informed that the Flinders University Ethics Committee had conditionally approved the approach. In addition, they received a copy of the interim solution strategies report in both English and Arabic (Appendices Q and R) and an outline in both English and Arabic of the questions to expect at the interview (Appendices S and T).

The list of questions was provided so that time was used effectively for each interview. According to Berglund et al. (2006), the interview is a time-consuming activity and the researcher should accommodate the interviewee as much as possible to manage the time and process involved. One such means is to provide interviewees with an advance copy of the questions. It was estimated that each interview would last approximately 30 minutes, and the letter contained an assurance of confidentiality, and appreciation for the participants' time and contribution.

Participants were also sent consent form (Appendices U and V) and a covering letter that provided information about the project, which included an assurance that the interview responses would be strictly confidential and used for research purposes only. Louis et al. (2007) stated the purpose of the covering letter was to indicate the aim of the interview, to convey to respondents its importance, to assure them of confidentiality, and to encourage their replies. The participants were informed that participation in the study was voluntary and they had the right to reject the interview or withdraw their consent at any time. Finally, respondents were thanked, in advance, for their cooperation.

A schedule with times and places for interviews was subsequently arranged with each person for the period between December 2014 and February 2015. Three female participants preferred to respond to the questions by email for cultural reasons, which was acceptable for collecting the pertinent data (Brenner, 2006). Consequently, there were fourteen face-to-face interviews. Where possible interviews were done in person, but because of transportation problems some were conducted via Skype or telephone. Following the interview, any missing information concerning certain issues was sent by email.

At the interviews, which were conducted either at the faculty offices or at a convenient place externally, the participant was asked to sign a consent form that ensured confidentiality, and granted the researcher permission to digitally audio record the interview if needed. Since it was a semi-structured interview, there was flexibility in the sequence of questions, and interview respondents were given the opportunity to elaborate on points they wished to make. A copy of the interview digital file was given to the interviewee when the interview ended, as part of the validity procedure (Brenner, 2006). The interviews were then coded and transcribed by the researcher.

6.2.4.1 Interview Data Validation

Unlike quantitative data methods where validation is based on statistical standards, the validity of interview data relies on the procedures for gathering data and how the collection instrument is designed (Brenner, 2006; Minichiello et al., 2008). There are a number of procedures employed to validate qualitative data, such as triangulation, member checking, and peer debriefing (Brenner, 2006; Creswell, 2014). In this study, validation of the raw data was determined through member checking and peer debriefing.

The validation process was one in which the researcher sent each participant a copy of both the Arabic interview transcript and English translation. Review of the transcription and translation validated the data that was collected (Creswell, 2014). Next, the researcher and two Saudi Arabian postgraduate students studying at Flinders University who were fluent in English reviewed the interview data analysis. The reviewers were asked to examine the interview transcriptions as well as the extracted findings to validate the translation process and the analysis (Brenner, 2006).

6.2.5 Data Analysis Procedures

In research, the data analysis stage is considered to be the most meaningful, in which selected analytical procedures convert the raw data into relevant information to provide answers for the research questions (Creswell, 2013; Johnson & Christensen, 2013).

In qualitative research, data analysis is an ongoing process which occurs while the data are collected. Minichiello et al. (2008) defined data analysis as a process of systematically arranging and presenting information in order to search for ideas. However, qualitative data analysis can be expensive and time-consuming (Bryman & Burgess, 2002; Burns, 2000). This study's qualitative data was collected through semi-structured interviews and open-ended questions on the student questionnaires. In both methods, the data were collected according to predetermined questions or themes. Therefore, thematic analysis procedures constituted a suitable technique to analyse the data (Bryman & Burgess, 2002; Burns, 2000; Minichiello et al., 2008). According to Minichiello et al. (2008), thematic analysis is employed where the researcher can identify themes emerging from an analysis of the interview transcripts.

In thematic analysis, coding is considered a significant procedure of the analysis (Bryman & Burgess, 2002; Burns, 2000; Minichiello et al., 2008). Bryman and Burgess (2002) explain that coding is the process of sorting and categorising data through a systematic examination of the transcripts to obtain meaningful categories (Burns, 2000; Minichiello et al., 2008). Coding themes were developed from the raw data derived from the interviews and based on the research sub-questions. To extrapolate from these themes, data were open-coded from the transcripts, whereby each line of the transcript was searched for meaning (Bryman & Burgess, 2002).

6.3 Interview Data Analysis[3]

Feedback varied from participant to participant and was not only related to their university and experience, but also their position. Feedback from participants holding high level positions was generally cautious and indirect in character. Conversely lower level professionals were more forthcoming in their comments.

The information in this section is organised in three sections to following the structure of the report. Each section provides a brief introduction and then a discussion of the feedback received from the interviewees.

6.3.1 Problems and Challenges

The report identifies three main problem areas and associated challenges that are preventing the effective use of ICT in Saudi universities, which are outlined in more detail below.

Feedback Summary:

Most of the feedback from participants agreed that the report covers well the most important problems that Saudi Arabian universities face. New issues have emerged that add to current problems. Some experts think that these problems still happen in small universities and emerging universities but have been largely resolved in the older universities. Faculty members and specialists in ICT and directors of e-services point

[3] This section is based on the publication titled ('Effective Use of ICT in Saudi Universities: Problems and solution strategies', by Fahad Alturise and Paul R. Calder, 2016 International Conference on e-Commerce, e-Administration, e-Society) and has been reformatted to departmental guidelines.

out that not all universities in Saudi Arabia have these problems but they certainly exist in newer ones.

6.3.1.1 Poor Infrastructure

From the report:

> *Many newly established universities lack the necessary ICT infrastructure, which should incorporate student computer laptops, access to desktop devices and office-based Internet, Wi-Fi Internet connections, smart classrooms, PCs for staff, and other software devices. Some new universities have acquired infrastructure as a consequence of merging with an existing university, but even then managing these problems is still critical, and leadership is frequently lacking in the IT department. Good ICT management is especially challenging for universities given that some have several campus sites. In fact, some universities have more than 20 campuses spread across different cities, which requires large budget outlays to keep the infrastructure functioning properly.*

Feedback:

According to the experts, many merging universities are suffering from infrastructure problems, especially those with several campuses that are geographically far from others, which has implications for budget distribution and providing resources. One faculty member in an information technology school situated 400 km from the main campus of one old university said the college was underdeveloped and lacked the necessary infrastructure such as good laptops, Internet connection, and faculty staff who are experienced. Even universities with good budgets experience a problem in distribution of money between colleges or dedicated ICT sections. According to a faculty member in one computer science department with Deanship of Quality Assurance and Accreditation, managers responsible for the quality of university resources stated that e-learning and information technology does not exceed 20% of the attention required in this area.

Some respondents also pointed out that poor infrastructure outside a university such as in small villages or even small cities is evident. Therefore, students do not have access to technology. According to one female faculty member in computer and information sciences:

> This will be a big problem because many students do not have a computer in the house and no available Internet connection at home. The problem is a serious problem especially for girls due to cultural reasons. This is one of the reasons for avoiding the faculty members about the use of technology

> especially if they do not have good infrastructure on campus.

One faculty member of an information technology school located 400 km from the main campus of one old university pointed out that the lack of Internet connection is very frustrating for students as well. This is because many students do not have the Internet at home. Internet availability is made possible through cable and Wi-Fi but it is not everywhere.

In still-to-be developed areas such as small towns and villages the Internet connection is very poor which will make it difficult to use this technology from home and in turn creates no interaction at all with the wider world. Moreover, the Internet infrastructure is lacking everywhere in Saudi Arabia because there are not enough communication companies. In fact only one company provides underground cables, a situation which creates no competition and poorer quality of services and the big loser is the customer. Thus, communication companies should be encouraged to do business in Saudi Arabia so that competition can lead to better infrastructure.

The lack of systems or other systemic problems due to quality also reflects the reality of poor infrastructure. The director of the systems department in a new university said, "Failure to adopt the 'digital certification and electronic signature' for financial transactions led to a delay in transferring to electronic system for departments associated such as warehouses and financial management". The dean of Computer and Information Sciences College and consultant in deanship of e-learning and distance education said:

> I may add a barrier related to maturity of ICT in the universities specifically when talking about the integration between different systems. As it is known, universities have several information systems such as student information systems, learning management systems, and ERP. The main challenge that faces Saudi government universities is the integration between these systems.

6.3.1.2 Low Skills

From the report:

> *University personnel often lack skills in utilising ICT software and hardware, largely because of a shortage of training. Even where faculty members and other staff have good ICT skills, the poor skills of co-workers cause delays and inefficiency because the large gulf between skilled and unskilled colleagues results in duplicated work, lack of completed work and communication difficulties. Furthermore, the lack of ICT skills in teaching staff has a 'knock*

on' effect for students who in turn lack skills because staff do not encourage them to use ICT in their studies or other administrative tasks.

Feedback:

Professionals also added one very important point which is that there are not enough qualified people running the IT or e-learning department. Usually in Saudi universities, choosing deans and directors depends on age and relationships and not qualifications, skills and job performance. Some IT or e-learning deans or directors do not have enough of a technology background which means that communication between them and their staff and others causes problems. Even when they do have the power to change this situation, there is still the problem of their lack of qualifications to consider. Moreover, the number of qualified staff in IT and e-learning departments is not enough especially in emerging universities. A faculty member in one computer school said problems are not being solved due to the lack of plans and qualified people. He noted that because universities do not have specialist decision-makers, they are not willing to implement these solutions in a proper way. It is very difficult for universities to bring in competent ICT staff despite the opportunities in salary, the opportunities to develop, a suitable place to live and other reasons. The director of a systems department in one northern university pointed out that the weakness of the salary scale makes it difficult to find suitable ICT qualified staff to fill the important and sensitive positions in the university. Moreover, a director of maintenance and technical support officer in another new university described how difficult it is to solve problems due to the small number of skilled employees.

University staff such as faculty members and administrative personnel also lack ICT skills. One faculty member at the school of computer and information sciences in a new university in northern Saudi Arabia, commented that faculty and administrative staff have little experience with technology and this means that work is not completed in the Faculty of Humanity and Arts. The director of maintenance and technical support in another new university noted:

> The existence of a large number of faculty members do not have the required skills to deal with the technology. As well as the existence of a class of seniors, whether administrative or faculty cannot cope with the means of modern technology, as well as the weakness of the technical culture among students on the importance of the use of technology in education.

6.3.1.3 Lack of Motivation

From the report:

> *Many staff do not feel motivated to engage with available ICT technologies or systems. Often, faculty members and administrative staff do not use ICT in their work because they see such work as the responsibility of others, or because they see a lack of guidance from university decision-makers or policy-makers. They perceive that the workplace simply lacks the kind of support it should have, to encourage them to use new technology or update their skills. Poor motivation in employees and poor local work culture can have serious effects on improving skills and using ICT in the workplace. For example, a common problem is that faculty members with high teaching loads are not motivated to spend additional time acquiring new ICT skills, especially if they perceive their colleagues having smaller teaching loads.*

Feedback:

According to the interviews, most universities experience a problem in motivating staff despite offering incentives in some areas. This situation varies from school to school, department to department and university to university because the legislation is not specific enough. This causes frustration between staff members. One faculty member and specialist in ICT and director of e-services said, “Most Saudi universities have the problem of motivation and incentives”. A female faculty member in the education technology field said, “Some faculty members still do not wish to use technology due to lack of incentives”. It is believed that motivation should originate at the high level decision-makers and directors in the universities and Ministry of Education, and should be supported by monitoring, infrastructure and clear legislation and training. A faculty member in one computer science department with Deanship of Quality Assurance and Accreditation pointed out that the university is largely interested in matters of e-learning and information technology, but quality has less importance. One faculty member at an information technology school located 400 km from the main campus of one old university noted the lack of monitoring from the Ministry of Education. Government officials may not care or there may be corruption in many universities which causes the lack of infrastructure in most universities to be endemic.

6.3.1.4 Other Problems Suggested by Participants

Another faculty member in a computer science department, a trainer in a training centre and who works in different technical positions in his university asserted, “We can also add ‘technical monopoly’”. He supports his suggestions that some specialists

or skilled technical and communications workers do not have elite status or are encouraged to provide leadership in their fields. Consequently they try to avoid providing learning environments and training programs which are the proper solution. The head of one computer science department and vice-dean of e-learning in a merged university commented, “There are other problems but not primary problem such as the fear of losing the position or privileges and there state after activate electronic systems or e-learning”. The head of a computer science department in a new university asserted, “I guess the geographical nature of a university, newness (emerging universities), the unique characteristics of human factor, maturity for ICT, lack of human resources are all crucial factors”.

6.3.2 Stakeholders

Solutions to these problems must be linked to university policies and practices in order to be effective. The most important people who can help with these problems are university managers and directors who have the authority and responsibility for implementing ICT, technical staff and external partners who will implement and support the ICT infrastructure. Furthermore there are also the teachers and administrative staff who will use ICT in their day-to-day work.

6.3.2.1 Decision-Makers

From the report:

> *Decision-makers should choose a qualified and highly experienced IT team that can develop both basic and more advanced ICT solutions. The most difficult step is changing from an old system to a new one and this means implementing change at all levels in the university. IT leaders should ensure that staff are appropriately trained to deal with hardware and software issues. The decision-makers include university presidents, directors, faculty or departmental heads, deans and senior administrative staff.*

Feedback:

Most of the feedback was consistent in that decision-makers in both universities and the Ministry of Education have the authority to implement these solutions. According to one faculty member in a school of computer and information sciences, and another who is on different committees in a new university (dean of e-learning), the senior levels in universities and Ministry of Education depend on having good, clear relationships to implement solutions. One faculty member in a computer science

department and having Deanship of Quality Assurance and Accreditation, thinks that university decision-makers are not corrupt, but may simply lack awareness of technology or ignore its importance in the modern world. Other respondents felt that decision makers may be discouraged from promoting and implementing electronic systems or e-learning because of a fear of losing their position or privileges.

6.3.2.2 Technical Support

From the report:

> *IT departments have many duties and they will have to replan their functions using qualified and experienced people. ICT infrastructure will have to be reconfigured so that it is used in a more effective way. Moreover, the Internet should be made available everywhere with the appropriate restrictions in place. Good technical support will help users to use services in all campuses, schools, departments, libraries and labs. Technical support includes IT departmental staff, IT staff in the schools and IT staff in administrative departments.*

Feedback:

The dean of Computer and Information Sciences College and consultant in deanship of e-learning and distance education said the most important stakeholder is the dean of IT. This is particularly so when solutions have to be implemented.

6.3.2.3 Other Stakeholders Suggested by Participants

Some professionals would like to add other stakeholders to this list. One faculty member in a computer science department, thinks that telecommunications and ICT companies could serve as partners to support the implementation of solutions. Telecommunication companies do not provide enough services to Saudi universities and their internal and external stakeholders. There are not enough ICT companies providing services to universities. This is especially the case in small cities and villages because those environments are not conducive to doing business. Moreover, some think students are the most important stakeholders because the majority of services are directed to them and if they do not use the services, it is a pointless exercise. For this reason alone Saudi universities have to facilitate services for students as much as possible.

6.3.3 Solution Strategies

We propose solution strategies that can be categorised as either cultural solutions, which focus on the people involved and the way they work, or technical solutions, which apply technology to enable and support that work. Neither type of solution is sufficient without the other. Without technical support, the benefits of ICT will be non-existent. Without cultural support, the money spent on implementing ICT is likely to be wasted (Almalki & Williams, 2012).

Feedback Summary:

According to the interviews, many professionals agree with most of the solutions and think they will be useful for many reasons. One faculty member and specialist in ICT and director of e-services said, "All solutions are logical and will help many universities but we have to start from the community and try to educate them first and after it will be easy to implement other solutions". Some point to solutions which have begun to be implemented in their university and others have planned to implement them, which is an encouraging sign. One faculty member in a computer science department noted, "My university has the necessary resources, plans and strategies that may assist all information and communication technology solutions, but it needs to have parallel cultural programs which are strong and serious". On the other hand, one female faculty member in the education technology field in one old university thinks that technical solutions are effective and they will change the user culture and resistance to technology.

6.3.3.1 Attractive Incentives (cultural)

From the report:

> *Universities should boost staff motivation by providing attractive incentives for improving workplace practices in the area of ICT. Universities have large government budgets and the money should be spent on training to learn incentive-related skills. This means in effect encouraging staff to improve their workplace attitudes and skills through the process of self-learning. Staff must be encouraged as much as possible to attend training courses and improve their sense of motivation and how to complete procedures, processes, routines, etc. that are ICT-based. Incentives will have to be evaluated by university decision-makers in terms of staff members' age, qualifications, experience and what will be required in the future.*

Feedback:

Two interviewees mentioned that there is an excellence award for distinguished users for ICT. This helps to motivate staff to use technology. Female faculty members in the education technology field in one old university point out how useful this excellence award in motivating other staff at their university. Most of them point out that this kind of solution is already implemented in their university but there is no monitoring or control. The government gives a 25% bonus for any employees who use computers and a person's job title/position is linked to the technology being utilised. For this reason many employees take this incentive even if or when they do not use ICT effectively. On the other hand, some employees may use computers in their work but they do not get this bonus due to the nature of their work and duties.

For example, in the past one university set several conditions to receive this bonus such as having a web page and many faculty members are paid to have a web page and they send the link to the university administrative staff to obtain the bonus. Another suggestion is that universities can link yearly salary increases and performance to encourage expertise in ICT. The university has legislation and policies in place for any bonus or award with follow up and monitoring. Training is another important point for developing solutions effectively. The head of one computer science department and vice dean of e-learning in a merged university remarked, "The most important solutions from my point of view are attractive incentives with clear legislation and training the user and try to improve their skills with same chance to become involved with that training".

Another faculty member of one computer science department noted, "There are some good technical incentives, for example quality of systems, lack of systems' complexity, confusion and problems and having strong technical support". Moreover, the director of maintenance and technical support services in another new university remarked, "There are always keen users of the technology who want it to be easy to use and available everywhere. One of these effective solutions is using smart phones to take advantage of all available properties".

6.3.3.2 Up-to-Date Policies and Rules (cultural)

From the report:

> *Government and university decision-makers should update all universities' mission statements, policies and rules concerning ICT and where and how it is used. Universities have to show staff these policies and rules and they should be worded in ways that give them the incentive to improve their ICT skills (Lim, 2007). Penalties should be introduced if staff do not attain the bare minimum standard of ICT skills such as using email, organising desktop spaces, creating online folders, etc. The university authorities should monitor staff usage and the specified minimum ICT services that are required in university teaching and administrative work. This will be fairly easy because most staff are young and faculty members have worked or studied in overseas universities, such as in the USA, UK and Australia where ICT usage is normal. Resistance to these policies and rules may emerge from older staff who should be given time to adjust to the newer policies and procedures.*

Feedback:

According to the experts, many policies and rules have not been updated for many years which means that roles, accountability, and processes associated with information systems and information technologies are obsolete. For this reason the Ministry of Education and Saudi universities have to start working together to resolve this problem. Some universities have started updating their laws and regulations, but they failed to apply solutions so nothing actually changed. The director of maintenance and technical support in one new university showed how important it is to: firstly, send emails to all employees to educate; and secondly, update them about the importance of information security and how to apply the concept of information security.

6.3.3.3 Comprehensive Usage Monitoring (technical)

From the report:

> *A comprehensive ICT usage monitoring system could track staff and student use of university ICT infrastructure, which would help university managers and IT leaders to identify which sectors of the university are not making effective use of ICT services. Information gathered by the monitoring system can be used to support cultural solutions; for example it could identify areas where incentives are not working well, or circumstances that cause policies to be ineffective. As an added benefit, the monitoring system can also serve to identify breaches of safety and security.*

Feedback:

Professionals suggested this solution is very important because it is a requirement to verify other solutions, especially applying policies and rules and to make sure incentives go to the right beneficiaries. According to one faculty member of a computer school, the university started to apply some solutions such as updating laws and regulations, but failed in the monitoring process so nothing really changed. This solution will allow staff to be more active in owning and using the technology and services. Female faculty members working in education technology in one old university state that comprehensive surveillance helps faculty members to compete when they know that there is a report sent to the college administration for their use. This was the first step to increase staff motivation. The dean of Computer and Information Sciences College and consultant in deanship of e-learning and distance education said, "Comprehensive usage monitoring and reporting" is a more precise name. Moreover, he is calling for the establishment of a PMO (Project Management Office) in the Ministry of Education to coordinate ICT solutions for the universities. Another faculty member in a computer science department remarked on the importance of statistical monitoring carried out by different levels of staff at the university, and the need to set standards of excellence when writing performance reports.

6.3.3.4 High-Quality Online Training (technical)

From the report:

> *Online training is an easy way to develop and update skills for staff and students. Universities should offer online training courses to suit a wide range of skill levels and needs. Staff should be required to demonstrate their competence in the skills needed for their situation, with regular assessments to ensure skills are up to date and the results used to direct users to the training courses appropriate to their current skill level. To be effective, courses must be designed by specialists such as those employed or contracted by ICT companies that are familiar with university requirements.*

Feedback:

All professionals pointed out that it is very important to have training in their universities for users and stakeholders. Female faculty members in the education technology field in one old university point out that solutions will not be effective and

continuous unless it is supported by training. They should be encouraged to develop a minimum skills set to ensure quality of work done using information technology. The director of an e-exam department in e-learning and distance education deanship in one of the oldest universities in Saudi Arabia pointed out how important it is to assess the results of these courses. For example, faculty members who want to use electronic or online lectures have to pass a basic distance education course on the latest modern technologies such as electronic e-exam system or dealing with learning systems LMS. Faculty members need to obtain at the very least an 80% pass mark to get access to these online services.

One faculty member of an information technology school 400 km from the main campus of an old university said training should be made available to students first. If the students accept this idea and he had the all resources to go online, the faculty member would use it as well because education and teaching would become so much more efficient. Trainers can benefit from these courses because they can upgrade their position or have their salary increased. The director of the systems department in a new university noted that to increase the number of attendees at the training courses, institutions should officially certify all courses and ensure that there is some practical benefit from the knowledge created.

The director of maintenance and technical support in another new university pointed out the responsibility of educating staff through training workshops where new technology is emphasised. Moreover, a female faculty member in education technology commented on the need to "set up multiple training courses and workshops on how they can facilitate the use of technology in teaching may help to increase motivation to use". She also asserted the importance of educating staff about every new technological development so that the necessary skills could be utilised. Finally, a faculty member and specialist in ICT and director of e-services said, "We do not need a lot of money to improve using ICT in university but we have to spend money to educate them and instruct beneficiaries".

6.3.3.5 Universal Access to ICT Infrastructure (technical)

From the report:

> *Universities should make ICT resources available to all staff and students. Where possible, access should be provided to all the resources that can be found on the Internet. If such access is not possible or not desirable, for*

example in campuses that are far from the main campus or that cannot afford universal access, a private staff-only Intranet should be implemented instead. Universal access to ICT infrastructure will encourage staff involvement in communication and collaboration, save time and reduce costs, provide access to business information and news, and facilitate on-line training and e-learning in the user's work context.

Feedback:

Most interviewees agree that all universities have to provide suitable ICT infrastructure for all stakeholders and users at all campuses, colleges, schools, departments and administrative offices. A good example was presented by the director of an e-exam department in e-learning and distance education deanship in one of the oldest universities in Saudi Arabia. Here, 1000 tablets were offered to do e-exams and this had the support of the supervisor of the e-exam department with particular reference to solving problems occurring during the exams. A faculty member of an information technology school 400 km from the main campus of an old university, said the ministerial committee should evaluate the infrastructure in all universities starting with their various branch campuses.

6.3.3.6 Other Solutions Suggested by Participants

Another important solution was presented in the interviews. With reference to technical support services, according to the director of one old university, institutions should provide 24/7 phone services to solve students' and technical staff's problems. The problems are due to issues that include lack of familiarity with all the details of new technology and weak training provided to them. Most employees work on a contract basis and because they consider themselves only temporary, they see no need to participate in ICT training.

6.4 Summary

This chapter explains the phase three design and methods that have been used to explore the views and experiences of faculty and ICT professionals at Saudi universities concerning the effective use of technology. An interview methods design was selected for this phase, where qualitative data were collected to determine the convergence or otherwise of people's opinions and perspectives in faculty and ICT contexts.

Qualitative data collection selected for this phase comprised semi-structured interviews with the faculty participants and ICT professionals in Saudi university regarding the report developed in the previous chapter, using open-ended questions to answer the research questions. Seventeen participants were interviewed. These interviews were conducted under research conditions and in the Arabic language, and data and translations were validated by interviewee and peer review. The questionnaires gave participants the opportunity to express their opinions on the report, and any recommendations or changes that should be implemented or considered. Finally, the qualitative data from the interviews, which were recorded, transcribed and translated, were analysed to extrapolate codes or themes from the transcripts. These were then sub-categorised and cross-tabulated (Bryman & Burgess, 2002). All data indicators were found to be valid.

CHAPTER 7 REWRITING THE SOLUTIONS REPORT

7.1 Introduction

The goal of this phase of the research was to identify problems and issues that require improving in the strategic solutions report discussed in Chapter 5, with a particular focus on the feedback provided during interviews with 17 ICT experts working in the Saudi university system, as discussed in Chapter 6.

The interviews covered all aspects of the report, including problems identified, stakeholder identification, and suggested solutions strategies. Interview respondents provided insights into how ICT is working for students, faculty and staff in their institutions and where it could be made more effective, and suggested changes to the report. The flow of the conversations and progression through the different steps of the process was the same for each interviewee, although the semi-structured nature of the discussions allowed for a focus on issues that were most relevant to each participant.

The end point of this phase was an updated report that retains the structure and most of the content of the interim report, but that incorporates improvements made as a result of the feedback. The final report is available as Appendix Y. The remainder of this chapter discusses feedback on the interim report and the resulting changes that were made in creating the final report.

7.2 Phase Approach

Ideally, the interim report would be reviewed by all stakeholders, including ICT professionals and experts both internal and external to the Saudi university sector, ICT managers and administrators from e-learning departments, and faculty members from computer science and IT schools. However, although we collected information from a variety of representatives, our sample was limited because of budget and time constraints. In particular, we were not able to speak with professionals outside the universities, especially those who are working in the education system and e-learning companies in Saudi Arabia. Input from this group regarding the report and their impressions of the most important problems they faced during ICT implementation in Saudi universities would be an important complement to this research.

The final report incorporates changes suggested by the results of the interviews, but also reflects the views of the researcher and material from the relevant literature. Some sections were changed to make them clearer or more focussed, generally as result of a more in-depth explanation from experts which helped clarify the issues in the report. As with the interim report, the final report is targeted at both a technical and non-technical audience in Saudi universities.

7.3 Findings and Recommendations

Here the researcher will highlight the most important feedback that interviewees provided on changes to the three main sections in the interim report: barriers, stakeholders and solutions.

7.3.1 Problems and Challenges

Interviewees generally agreed that the problems and challenges identified by the interim report were significant and accurate. Comments from interviewees helped identify the source of the problems or clarify their consequences. In the final report, the wording of the problems wasn't changed, but changes were made to the titles of the problems to better characterise their nature.

7.3.1.1 Infrastructure Management

Instead of poor infrastructure, many interviewees pointed out directly or indirectly that Saudi universities lack basic infrastructure *management*. They point out that Saudi universities in general have large enough budgets to build good infrastructure, but that some have succeeded while others have not and this is due to their management. Universities have to benefit from their available infrastructure as much as they can and they must not stop trying to implement ICT despite management problems. Several interviewees suggested that universities have to find a balance between departments and schools, perhaps by focussing initially on the core infrastructure and then offering accessories later. Interviewees pointed out that problems with poor ICT management could be due to lack of professionals working in IT departments or to spending the budget on less essential items.

Interviewees pointed out that universities have to focus on their ICT implementation plan and employ ICT experts in every department, school and campus. Also, they have to learn from the experiences of other Saudi universities how to solve this problem.

Although there is a lack of ICT infrastructure in some areas, the universities can still update their ICT infrastructure and this is happening in the most important buildings such as the chancellor's office, and those of the deans and managers. This is a waste and extravagance according to some interviewees. Instead, Universities should focus on improving learning and education outcomes.

As the interim report already pointed out the importance of infrastructure management, no changes were made to the wording of this section. However, in the final report the title of the section was changed to better reflect the nature of the problem.

7.3.1.2 Skill Levels and Qualification

Some interviewees felt that rather than identifying low skill levels as a problem, it would be more useful to identify staff qualifications as the issue. Saudi universities rarely employ new staff, and since most improvements in technology happened after the modernization of the Saudi university system began 30 years ago, many universities have missed out on this development to the detriment of faculty members and most administrative staff. Moreover, since most university personnel are over 45 years of age, improving their skills through training will not be as effective as for younger staff. Several interviewees pointed out that the lack of qualified people is difficult to overcome for some universities because of geographical issues. Qualified staff will want to work in universities in cities offering better conditions and salaries, such as in the bigger cities. Also, border universities encounter the problem of staff training which is expensive to undertake and not easy to implement for older staff.

Some interviewees pointed out that a blend of unqualified staff and qualified staff will usually lead to an improvement in skills due to competition, which suggest that universities have to be more proactive by employing qualified people who will improve the workplace environment. Some interviewees feel that this issue will be solved in the future after new a generation of people will replace older staff. New staff could be recruited from those people who benefited from Saudi Arabia's scholarship program. In summary, lack of staff skills is a big problem especially for older personnel but interviewees think that universities will only worsen this problem by employing unqualified people. Employing qualified staff is easier and less time-consuming than training staff.

In response to the feedback, the title of the section in the final report was changed to emphasise that the problem is more correctly identified as relating to staff qualifications rather than low skills.

7.3.1.3 Importance of Decision-Makers Support

Most interviewees agreed that motivation is a problem. However, most saw the problem as relating to a lack of encouragement and support from university decision-makers rather than a lack of initiative on the part of faculty members or administrative staff. They felt that decision makes have the power and privilege to encourage other stakeholders to use ICT more effectively by updating policies and rules, establishing procedures, implementing monitoring mechanisms, and setting institution goals and directions. In general, each stakeholder's motivation should be linked to motivation of other stakeholders. For example, if faculty members embrace ICT, students and administrative staff are more likely to follow.

Most of the interviewees believe the lack of motivation for all stakeholders is one of the most important reasons affecting the use of ICT, and that it is the lack of decision-maker encouragement and support that is the main cause. Lack of support at the high levels of the organisation leads to poor infrastructure, lack of training, lack of motivation and other issues. Interviewees point out that support from decision-makers is the key to helping overcome all of these problems and driving improvements in other stakeholders' motivation.

As the interim report already identified the importance of decision maker support, no changes were made to the wording of that section. However, the title of the section was changed to better identify the source of the underlying problem.

7.3.2 Stakeholders

Several interviewees emphasised the importance of interaction between stakeholders that were internal to the university sector and those external to the sector. In response, the final report adds a brief discussion of this interaction to the introduction of the stakeholders section, and it identifies each stakeholder as either internal or external.

7.3.2.1 Students

Many interviewees pointed out that students constitute one of the main stakeholders and they need to be helped with suitable ICT programs (Moraru, 2012). Students can

help sometimes to motivate and encourage faculty members to use ICT in their teaching duties. Moreover, lack of use of ICT by students will affect how other stakeholders utilise it as well. The effective use of ICT in universities should involve all stakeholders working together and not ignore the importance of any of them. Therefore, the final version of the strategies solutions report comments on students as internal stakeholders, with an importance that follows that of the decision-makers and faculty members.

The final report contains this additional stakeholder section:

> ***Students (internal)***
>
> *Students should be encouraged by faculty members to use available ICT services throughout their university life. The focus of ICT services should be to support students and facilitate the completion of their study. Students include those studying at all levels -- Bachelor, Master and PhD – and those attending classes either on campus or remotely.*

7.3.2.2 Private Sector Bodies and Parastatal Organisations

Several interviewees pointed out that the relationship between internal and external stakeholders is very important if universities want to improve, and that the private sector can help universities to overcome their technology problems and drawbacks. There are many private sector companies that the universities can develop strong relationships with due to their expertise in providing telecommunications, educational technologies, and software. The private sector companies can be categorised as external stakeholders and they will strongly influence the quality of ICT in university environments through hardware infrastructure and software systems. Also, parastatal organisations such as Communications and Information Technology Commission, the National Centre for E-learning and Distance Learning, and the Ministry of Education, can support and shape the improvement of ICT in Saudi universities. For example, the Ministry of Education can ask the private sector to provide services to the universities not only for profit but as a community service. Also, universities can benefit from training courses and workshops and conferences that are provided by the National Centre for E-learning and Distance Education.

The final report contains this additional stakeholder section:

Private Sector Bodies and Parastatal Organisations (external)

Working relationships should be established with private sector bodies and parastatal organisations who have expertise to support efforts by universities to use ICT to facilitate education. Private sector bodies include communication companies, educational technology companies, information and network technology companies and ICT training companies. Parastatal organisations include the Communications and Information Technology commission, the King Abdulaziz City for Science and Technology, and the National Centre for E-Learning and Distance Learning.

7.3.3 Solution Strategies

Interviewees felt that the interim report's categorisation of solutions into cultural and technical categories was useful, and that the proposed solution strategies were generally appropriate. The final report therefore retains most of the content of the interim report, although specific feedback resulted in changes to two of the solutions, as detailed below.

In addition, the final report includes an additional paragraph in the introduction to the solution strategies that emphasises the importance of solutions that address both cultural and technical issues, and the overlap between these solution categories.

7.3.3.1 Appropriateness of Incentives

Interviewees felt that the discussion of incentives was too narrow, and that it implied that the emphasis was entirely on financial incentives. They pointed out that a financial incentive is only one way to increase motivation and universities in Saudi Arabia will need to use many other strategies to encourage stakeholders to use ICT more effectively. Different strategies would work for different categories of stakeholder, and for different individuals within each category. Some interviewees emphasised the importance of motivating staff by public acclaim, perhaps by publishing on the university's website each month the best ICT user in a department or school. Others pointed out that minimising work and teaching loads for the best users is an attractive incentive, and that skilled ICT users can help others with their training or workplace needs.

Several interviewees emphasised the need for fairness in availability of incentives across the stakeholder categories, and the need to test the effectiveness of a motivation strategy to make sure it is valid for all stakeholders in Saudi Arabian universities.

Others interviewees pointed out that incentives are already used in many Saudi universities but that the effectiveness of the incentive is an issue. For example, a certificate does not necessarily mean that the recipient knows how to use ICT effectively or properly. For this reason some interviewees think that universities have to find another ways of motivating staff so that they use ICT efficiently.

In response to the feedback, the title of the section on incentives in the final report was changed, and the text was rewritten to emphasise the need for a diverse range of incentive strategies, the need to use appropriate strategies for each category of stakeholder, and the need to make sure that incentives are working effectively.

7.3.3.2 Broader Delivery Mechanisms for Training

The interim report suggested that online training be used to improve the ICT skills of stakeholders. Many interviewees pointed out that although training is very important, it is difficult to apply online training currently in Saudi universities. Poor ICT infrastructure means that faculty and staff do not have access to this kind of training. Another point of view point is that participants must have a certain level of ICT skills to cope with online training. In particular, older staff members need to practice with ICT prior to training so that they can gain some skills beforehand and build their confidence.

Several interviewees pointed out that one of the benefits of traditional training courses, is to provide information about the problems that affect faculty and staff usage through feedback, discussions and questions, Moreover, face-to-face course attendance will help to overcome the disadvantages felt by participants during online training such as lack of physical interaction, lack of motivation, etc. Universities will have to focus on the quality of these traditional training courses and workshops and improve them according to trainees' and trainers' feedback and suggestions. Once appropriate infrastructure is in place and an initial skill base established through traditional training methods, universities will be able to move more easily to online training modules.

In response to the feedback, the title of the section on training in the final report was changed, and the emphasis on on-line deliverer was removed.

7.4 Summary

In conclusion, the review of strategic solutions for the effective use of ICT in Saudi universities detected a number of issues that could be addressed to make the report more relevant to university decision-makers and those in charge of Saudi Arabia's higher education system. The final report (Appendix Y) retains most of the content and organisation of the interim report and incorporates several improvements suggested by feedback from ICT experts.

CHAPTER 8 DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

8.1 Introduction

This research investigates the most important problems and the solutions concerning information and communication technology in Saudi Arabian universities and especially the newer institutions. The previous chapters present an in-depth discussion of the findings and in this chapter a summary of the discussions and outcomes of each chapter are outlined with reference to the literature and the original research questions. Some recommendations at the end of this chapter will be provided, followed by conclusions about the research and recommendations for implementing ICT in Saudi Arabian higher education. The chapter also highlights the main limitations of this study with suggestions for further research studies. This chapter ends with a summary.

8.2 Discussion of the Findings

This section discusses the results obtained from the research. The results have been classified into various categories that summarise the barriers or problems regarding the deployment and use of ICT in Saudi Arabian universities. These are followed by proposed solutions that may help to solve the important issues. These solutions were validated by professionals working in Saudi universities and conclude with final strategic solutions based on their feedback.

8.2.1 Barriers and Challenges

Chapter 4 reports on Phase 1 of the research, which investigated problem with ICT implementation in Saudi universities using questionnaires given to the main stakeholders: faculty members, staff and students. The results from Saudi universities were compared with those obtained in the Gulf States universities, these being Qatar, Oman, Bahrain and United Arab Emirates to assess the weaknesses in Saudi Arabia's universities and compare them according to cultural background, religion, economy and language. The most significant barriers are summarised here. Some problems are the result of other problems in ICT. This means focusing on how to solve the main barrier so that smaller ones are automatically taken care of.

A significant barrier to effective ICT use in Saudi universities is the issue of poor status of ICT infrastructure - not in every part of a university and every campus - but in some part of the institution. Having only a partially completed ICT infrastructure is of no benefit because the lack of ICT infrastructure leads to unequal opportunities for students, faculty members and staff; less effective 'real time' communication because stakeholders cannot use one official way to communicate; and an inability to use ICT for everyday administration, teaching or studying. Poor ICT infrastructure may result from choosing the wrong software and hardware for the university, which cannot be integrated properly if at all. All of these issues could affect stakeholders' usage and encourage decision-makers and stakeholders to lose confidence in ICT systems.

These infrastructure problems could be overcome by having professional ICT staff supported and employed by university decision-makers, and letting them get on with the job of supporting the departments and campuses with suitable ICT infrastructure. Doing so will require the cooperation of university management and government policy-makers working together. Effective high-level input can support IT department integration plans by resolving all barriers and problems with the provision of proper budgets, professional expertise, staff and time.

The second barrier to Saudi Arabian universities' effective use of ICT lies in the low levels of skills of the stakeholders. Faculty and staff members may not have basic ICT skills such as surfing the Internet, dealing with university systems, typing, connecting to the Internet, etc. Faculty members may not know how to use available technology in their class activities or in terms of what the teaching pedagogy requires. These drawbacks endanger staff motivation and morale, but universities can overcome this problem by making sure that new staff have the basic skills and confidence to deal with ICT. Universities can design special courses to improve staff members' ICT skills and support users by offering training guides and online instruction manuals for every system.

The final barrier is that university and government decision-makers are not motivated to make the required changes. What they do in terms of implementing ICT will positively or negatively affect universities. Decision makers can help by providing bigger budgets and by supporting their ICT plans and arranging to facilitate university requirements with other governments and organisations. Decision-makers in the

universities such as chancellors, deans, managers and ICT professionals can influence how faculty and staff members work by providing incentives such as better workload, professional development training courses, and workshops. Moreover, faculty members strongly influence students' ICT usage. Faculty members can encourage students by using ICT intensively in their courses through class activities, assignments and to communicate instructions or other students. It can be concluded that increasing the motivation of decision-makers and staff and students to embrace ICT is critical to Saudi universities operating in the 21st century.

Chapter 4 provides answers for the research questions for Phase 1. In particular, the differences in the responses from Saudi and Gulf State respondents suggests that there is indeed a difference in attitudes towards ICT and use of the technology (Q 1.3), which helps identify the barriers to adoption of the technology in Saudi universities (Q 1.2) and in turn suggest why Saudi universities do not make as effective use of the technology as their colleagues in other countries (Q 1.1).

8.2.2 Interim Strategic Report

Chapter 5 reports on Phase 2, which developed an interim report proposing strategic solutions for ICT problems in Saudi Arabia. A systematic and focused approach is the method that is used to establish this report, which was based on the results of the Phase 1 data collection supported by the literature review. This report is primarily intended to help Saudi universities to solve their ICT problems, but may also be of assistance to institutions in other countries.

The report contains three parts: barriers, stakeholders and solutions. The first section examines three barriers: poor infrastructure, low level of skills and lack of motivation. The next section is about stakeholders which include the most important and effective people who can help to change the ICT environment and implement technology in university. The four stakeholders are decision-makers, technical support groups, faculty members and administrative staff.

The third and most important section involves solutions, which are characterised as either cultural or technical. Cultural solutions try to solve some cultural barriers that prevent the effective use of ICT in Saudi Arabia's universities. Incentives can help overcome the lack of motivation in universities, and can work in different ways depending on the stakeholders' characteristics, their position and the university's

ability to implement them. In addition, up-to-date policies and rules is another solution to back up incentive. Universities have to update their rules and policies and especially those regarding technology. This solution will help to make sure that all processes, solutions and implementations follow university regulations and legislation correctly.

Technical solutions address technical barriers and are supported by cultural solutions. The first technical solution is comprehensive usage monitoring which can help to evaluate the use of ICT in university and make decisions. It will assist universities to create incentives and this can be reinforced by high quality online training to improve stakeholders' computer skills. To guarantee the effectiveness of this kind of training, proper professional design is required in various sciences such as technology, education and the social sciences. Universal access to ICT infrastructure is the last solution to solve ICT infrastructure issues. This solution could be implemented not just by universities but also by electronic communications, software and education companies. University campuses and their departments must have the same level of infrastructure so that all stakeholders enjoy equal access to computer systems.

The solution strategies report discussed in Chapter 5 answers the research questions for Phase 2 by identifying the main barriers for students, faculty members, and administrative staff (Q 2.1), the main stakeholders that would be involved in the solutions (Q 2.2), and proposed solutions for overcoming the barriers (Q 2.3).

8.2.3 Validating the Report

Chapter 6 describes Phase 3, the validation of the interim strategic solutions report developed in Phase 2. Professionals in the universities, including faculty members and staff, were interviewed and asked to comment on the interim report. All of the professionals have a job that depends on ICT and technology. In general, most interviewees agree with most of the report and verified that what is documented in it is true. The results of the interviews were summarised and categorised, and served as the basis for an updated report. Some interviewees' comments include mention of additional barriers, stakeholders or solutions. Others suggested changes in the report structure especially in the solutions section. The final report will help decision-makers and ICT professionals develop a plan for a much better ICT structure in Saudi Arabia's universities.

Chapter 6 provides answers for the research questions for Phase 3 by showing that solutions used in other contexts can indeed be applied in Saudi universities (Q 3.1), and that adaptations can be made to such solutions to suit the Saudi context (Q 3.2).

8.2.4 Final Strategic Report

Chapter 7 discusses Phase 4, the process of rewriting the solutions report and the changes from the interim report. The interviews provided much useful feedback which resulted in both additional information and better focus.

Many interviewees believe that poor infrastructure is evident in Saudi Arabia and this is due to poor management. Changing and improving on the low level skills of people will mean working to overcome the lack of qualified staff in universities' IT departments, planning and quality teams, management teams, etc. The last barrier is the lack of motivation, and interviewees believe that effective decision-makers can change other stakeholders' attitudes to ICT in the university.

In relation to stakeholders, the interviewees agree that it is important to add one or two more types of stakeholders to the report. It now has six stakeholders instead of four. Interviewees mention the importance of students and private sector companies and parastatal organisations as new stakeholders who can help with ICT issues in the universities.

Reading and focusing on the interviewees' answers is the most important way to help rewrite the report. Although the changes between the interim and final version of the report were relatively minor, they improved both its clarity and its depth and thus make it more valuable for its intended purpose.

8.2.5 Summary

In this section all phases of the research were summarised. The most significant barriers that impact on the utilisation of ICT in Saudi Arabian universities were outlined here. Then the most important and useful solutions that could help in Saudi Arabian universities were investigated. These strategic solutions can be presented to the decision-makers and professionals in the universities and Ministry of Education in the form of a report to plan ICT development in the universities.

8.3 Conclusions

Technology is always changing and it demands people engage in life-long learning so that they gain new skills and knowledge. The technology itself is neutral but it can greatly increase humanity's welfare and learning, depending on how well it is used. Developing countries such as Saudi Arabia should integrate ICT into their universities' organisational structures more effectively than they do now. In order to compete with other developing countries and most industrialised nations in higher education and survive economically, applying ICT effectively and developing new organisational structures is vital. Having recognised the role of ICT in managing organisational change, education institutions in developing countries should not misinterpret ICT as being a substitute for the work force. They must give serious attention to ICT integration helping to develop a better trained and qualified professional and skilled workforce. Using ICT in universities has the potential to greatly improve how university operates internally.

The integration of information and communications technology in teaching, learning and administrative tasks in universities means incorporating a variety of approaches and pedagogical philosophies. However, ICT as a teaching aid is more complicated in that it demands more specific skills from the institutions, individuals and societies. This study investigated barriers that prevent universities, their faculty members, administrative staff and students from making effective use of ICT in Saudi Arabia. The growing use of ICT - particularly the Internet - was the catalyst for the changing paradigm of instruction.

Universities in developing countries are experiencing some important challenges and barriers that prevent them employing ICT effectively. This study pointed out that Saudi universities face three important barriers: poorly managed ICT infrastructure, shortage of ICT-qualified staff, and lack of motivation. Furthermore there are some other problems but these can be solved once the main ones mentioned above are overcome. This study also concluded with some solutions that could help ICT implementation in Saudi Arabian universities: increasing motivation for all stakeholders; updating policies and rules; comprehensive usage monitoring; ICT training and workshops; and universal access to ICT infrastructure. These solutions were presented in a report that could be used by other universities in developing countries with similar characteristics.

It can be concluded here that implementing ICT has the potential to help improve the efficiency of higher education in Saudi Arabia in terms of generating better quality and capacity. In particular, ICT can enhance interactions and communications between students, instructors and staff in Saudi universities, which eventually will enhance university activities.

8.4 Limitations of the Research

Like any project, limitations are an expected part of any research. In this research, a number of limitations are acknowledged. The research results were interesting in terms of the challenges of ICT services usage in the Saudi Arabian universities and how to overcome them. This research focused on the culture of the Gulf States which are in general Arab and Muslim cultures. However, there were some limitations in this study. These limitations could provide a direction for some interesting future research studies.

It is very hard to cover all Saudi and Gulf States universities due to the large geographical area which is the first limitation of the study. This research was undertaken in the initial stages in Saudi Arabia and Gulf States countries during the holiday season and it was very difficult to visit all the universities at a specific time because Saudi Arabia is a very large country and distances between universities and their campuses are large. This needs more time, money and effort. The participants in this research are located in 10 public higher education institutions in Saudi Arabia and 5 universities in the Gulf States. The system of government in Saudi Arabia is very bureaucratic and it was difficult to get permission to do any work such as collecting data. In the data collection stage, it was very difficult to get responses from all the universities in Saudi Arabia and other Gulf States. Also, even if an invitation to visit was received it was very difficult to arrange data collection from faculty members, students and staff at the same time. There were also limitations in the time needed for data collection and visiting all universities, and the rejection encountered by some faculty and staff members.

Having only three months to get the data was not enough, given that there are more than 15 universities in different countries. There were challenges regarding the time difference between Australia and Saudi Arabia, and between Saudi Arabia and other Gulf States in the university year. Another limitation in this study was collecting data from female participants due to segregation of education between the sexes. It is very

difficult to get enough data from females in Saudi Arabia due to the difficulties in contacting female stakeholders. Out of 774 respondents to the surveys only 33% were female. Therefore, the conclusion reached is that this sub-set of the sample might not fully represent female views. Finally, all of the Saudi universities in this study are public or government universities and not private establishments. Thus the results cannot be generalised to all higher education institutions. Student participants were from all kinds of schools except Information Systems, Computing Science and Information Technology. Arts and humanities departments were examined here, yet the study excluded students who are more familiar with mobile and learning technologies. This phase of the research utilised the quantitative data collection procedure with some open-ended questions; qualitative methods were not widely utilised in this phase. Furthermore, it was outside of the scope of this research to use online surveys in Saudi Arabia and the Gulf States because it will exclude many people who live in rural areas.

Regarding the limitations in validation of the proposed solution report, the main limitation was that all professionals interviewed here were from Saudi Arabian universities and have a good ICT background, and are thefore more familiar with mobile and learning technologies barriers and solutions than those who do not have this trait. The semi-structured interviews were conducted only with interviewees at 10 universities although a larger sample could have been used. It is unlikely, however, that many other key issues would have been identified. The interviews were conducted with ICT professionals in Saudi Arabian universities. Also, the same situation in data collection with female participants occurred. Therefore, the sample size for interviews was 17 of which only 3 were female, which could be due to the fact that the arranged contact was very difficult and/or the percentage of female workers in the ICT field is lower than male workers. This phase of the research utilised the qualitative data collection procedure and open-ended questions were not widely employed during this phase.

The findings of the study are also limited to a specific context - universities in Saudi Arabia - and a specific purpose - to improve technological access and usage in higher education. Whilst some results will be transferable to other situations, the finding are unique to the variables within this context. This limitation is acknowledged yet it can be argued that professionals engaged in similar situations will draw information from

this research which is relevant to them, guiding them to relate the findings to their own situations. In spite of the previous limitations, the research's findings are believed to be applicable to universities in other Arab countries and developing countries that share basic national and demographic characteristics with Saudi Arabia such as the Gulf States countries.

8.5 Future Research

In light of the limitations of this study and other issues arising during and as a result of this research and in the literature, some possibilities for further study are mentioned below. The findings of this research established many key factors relating to the implementation of ICT in Saudi Arabia's universities. These factors can be used to guide the successful implementation of ICT especially in new universities in Saudi Arabia which have suffered from some problems.

Other studies of the same type may allow scope to verify and generalise results. This analysis will support many studies in ICT fields in Saudi Arabia so that ICT is better integrated. It could also encourage the expansion of ICT in other developing countries which have similar characteristics. As this study focused on the Gulf States universities, a study about Arab or developing countries may help to investigate more barriers and solutions regarding ICT in Saudi Arabian universities from their point of view. Future research in other geographical areas with different cultural backgrounds is recommended. Since the sample for this study consisted of a small number of Saudi Arabian universities, more should be included in a future study. It would then be useful to compare the results and assess the extent of changes caused by the continuing use of ICT in higher education across a larger scale.

In addition, since this research highlighted several solutions that need to be considered in the application of Saudi Arabian universities to help using ICT effectively, more focused studies in these particular areas would be useful. Moreover, such focused studies will allow ICT researchers concentrate on finding other solutions and challenges and barriers that discourage employing ICT in Saudi Arabia's universities and examine them. They can do this in an effective way with the help of government institutions and ideas emanating from other developing countries. Further research is also recommended to minimise the identified challenges and solve problems in order to suggest any future implementation the best chance of success. Finally, the results

reached in this study are believed to assist Saudi Arabian universities and those in other countries with similar characteristics across key variables in ICT planning and take-up. Hence, comparative studies could be done to match the findings of this study with other developing countries.

8.6 Summary

This current research investigates the most important barriers in Saudi Arabian universities and their use of ICT, particular as it is used by students, faculty members and administrative staff. It has highlighted several solutions that need to be considered in the universities, and these solutions need more validation to measure the impact of offered solutions. Further studies of the same scope should be carried out so that results can be generalised to evaluate their impact in other universities in Saudi Arabia, Gulf States and developing countries.

This chapter briefly reviewed the findings of this research in terms of the research phases. It also outlines several limitations of the research. Based on the findings of this research, a number of recommendations for successfully adopting ICT were presented in this chapter as well. The chapter then concludes by presenting several suggestions for future research. Finally, this study has hopefully contributed to the growing body of knowledge in the field of using ICT effectively in universities and particularly in Saudi Arabia. The outcomes of this study provide a starting point for making changes in the universities.

REFERENCES

Abrahams, D. A. (2010). *Technology adoption in higher education: A framework for identifying and prioritising issues and barriers to adoption of instructional technology*. Journal of Applied Research in Higher Education, 2(2), 34-49.

Abu-Al-Aish, A. (2014). *Toward mobile learning deployment in higher education.* (Doctor of Philosophy), Brunel University, London.

Abu Nadi, I. K. (2012). *Influence of Culture on e-Government Acceptance in Saudi Arabia.* (Doctor of Philosophy), Griffith University.

AGU. (2010). About the Arabian Gulf University University. Retrieved July, 2015, from http://www.agu.edu.bh/english/university/uni_about.aspx

Ahamad Nalband, N., & Al-Amri, M. S. (2013). *Corporate social responsibility: Perception, practices and performance of listed companies of Kingdom of Saudi Arabia*. *Competitiveness Review: An International Business Journal, 23*(3), 284-295. doi: 10.1108/10595421311319843

Ahmed, S., Buragga, K., & Ramani, A. K. (2011). *Security issues concern for E-Learning by Saudi universities*. Paper presented at the 13th International Conference on Advanced Communication Technology (ICACT), Seoul.

Al-Alwani, A. E. S. (2005). *Barriers to integrating information technology in Saudi Arabia science education.* (Doctor of Philosophy), University of Kansas.

Al-Asmari, A. M., & Rabb Khan, M. S. (2014). E-learning in Saudi Arabia: Past, present and future. *Near and Middle Eastern Journal of Research in Education, 2*(1).

Al-Dali, W., Fnais, M., & Newbould, I. (2013). Private Higher Education in the Kingdom of Saudi Arabia: Reality, Challenges and Aspirations. In L. Smith & A. Abouammoh (Eds.), *Higher Education in Saudi Arabia* (pp. 127-136). Netherlands: Springer.

Al-Ghamdi, S., & Tight, M. (2013). Selecting and Developing High-Quality Academic Staff. In L. Smith & A. Abouammoh (Eds.), Higher Education in Saudi Arabia: Achievements, Challenges and Opportunities (pp. 83-93). Dordrecht: Springer Netherlands. 10.1007/978-94-007-6321-0_8

Al-Khalifa, H. S. (2010). E-Learning and ICT Integration in Colleges and Universities in Saudi Arabia. *eLearn Magazine, 2010,* 3.

Al-Mamari, Q., Corbitt, B., & Gekara, V. (2014). E-Government Adoption and Implementation in Oman: A Government Perspective. In A. Haider (Ed.), *Business Technologies in Contemporary Organizations: Adoption, Assimilation, and Institutionalization: Adoption, Assimilation, and Institutionalization* (pp. 263-287). United States of America: IGI Global.

Al-Mamari, Q., Corbitt, B., & Oyaro Gekara, V. (2013). E-government adoption in Oman: motivating factors from a government perspective. *Transforming Government: People, Process and Policy, 7*(2), 199-224. doi: http://dx.doi.org/10.1108/17506161311325369

Al-Oteawi, S. M. (2002). *The perceptions of administrators and teachers in utilizing information technology in instruction, administrative work, technology planning and staff development in Saudi Arabia.* (Doctor of Philosophy), Ohio University.

Al-Shammari, M. O., & Higgins, S. (2015). *Obstacles Facing Faculty Members in the Effective Implementation of e-learning at Some Universities in Saudi Arabia*. International

Journal of Information Technology & Computer Science (IJITCS). Volume: 19 , Issue: 1. ISSN : 2091-1610.

Al-Shehri, S. (2013). An Outlook on Future Mobile Learning in Saudi Arabia. *QScience Proceedings, 2013*(12th World Conference on Mobile and Contextual Learning (mLearn 2013), 9). doi: 10.5339/qproc.2013.mlearn.9

Al-Shehri, S. (2014). Mobile Learning in the Arab World: Contemporary and Future Implications. In X. Xu (Ed.), *Interdisciplinary Mobile Media and Communications: Social, Political, and Economic Implications: Social, Political, and Economic Implications* (pp. 48). United States of America: IGI Global.

Al Alhareth, Y., McBride, N., Prior, M., Leigh, M., & Flick, C. (2013). *Saudi Women and E-learning*. The Future of Education.

Al Alhareth, Y. (2014). *E-learning Accessibility for Saudi Women: A Literature Review*. International Journal of Emerging Technologies in Learning (iJET), 9(4), 65-67. Kassel, Germany: International Association of Online Engineering.

Al Doghan, M., & Albar, S. (2015). A Study on Influence of Motivation Factors on Employees Performance in Private Schools in Saudi Arabia. *Journal of Human Resource and Sustainability Studies*, *3*(04), 179.

Al Gamdi, M., & Samarji, A. (2016). Perceived Barriers towards e-Learning by Faculty Members at a Recently Established University in Saudi Arabia. *International Journal of Information and Education Technology, 6*(1), 23.

Al Mulhim, E. (2014). The Barriers to the Use of ICT in Teaching in Saudi Arabia: A Review of Literature. *Universal Journal of Educational Research, 2*(6), 7. doi: 10.13189/ ujer.2014.020606

Al Musawi, A. S. (2012). Current Aspects and Prospects of ICT in the Arab Higher Education Sector: Literature Review. In F. Albadri (Ed.), *Information Systems Applications in the Arab Education Sector* (pp. 1-22). United States of America: IGI Global.

Al Rajhi, A., Al Salamah, A., Malik, M., & Wilson, R. (2012). Economic Development in Saudi Arabia. (pp. 32-33).

Taylor & Francis.Alamri, M. (2011). Higher Education in Saudi Arabia. *Journal of Higher Education Theory and Practice, 11*(4), 88-91.

Alarabi, O. (2013). *Challenges the use of e-learning with faculty members Institutes teaching Arabic to nonnative speakers in the Kingdom of Saudi Arabia*. Paper presented at the Third International Conference of e-Learning and Distance Education (eLi3), Riyadh, Saudi Arabia. http://www.alukah.net/Books/Files/Book_3351/BookFile/el%20aloktron.pdf

Alaugab, A. M. (2007). *Benefits, barriers, and attitudes of Saudi female faculty and students toward online learning in higher education.* (Doctor of Philosophy), University of Kansas.

Albalawi, M. S. (2007). *Critical factors related to the implementation of web-based instruction by higher-education faculty at three universities in the Kingdom of Saudi Arabia.* (Doctor of Education), The University of West Florida.

Algahtani, A. (2011). *Evaluating the Effectiveness of the E-learning Experience in Some Universities in Saudi Arabia from Male Students' Perceptions.* (Doctor of Philosophy), Durham University.

AlGhamdi, R. (2012). *Diffusion of the Adoption of Online Retailing in Saudi Arabia.* (Doctor of Philosophy), Griffith University.

Alhazzani, N. (2013). *Information Technology Challenges faces Higher Education Institutions from the point of view of academic and administrative leadership at King Saud University*. Paper presented at the Third International Conference of e-Learning and Distance Education (eLi3), Riyadh, Saudi Arabia.

Alhussain, T. O. (2011). *Factors Influencing the Adoption of Biometric Authentication in Mobile Government Security.* (Doctor of Philosophy), Griffith University.

Alkhalaf, S. (2013). *Creating Effective E-Learning Systems for Higher Education in Saudi Arabia.* (Doctor of Philosophy), Griffith University.

Alkhalaf, S. S., Nguyen, A. T., & Drew, S. (2010). *Assessing eLearning Systems in the Kingdom of Saudi Arabia's Higher Education Sector: An exploratory analysis.* Paper presented at the International Conference on Intelligent Network and Computing (ICINC 2010), Kuala Lumpur, Malaysia.

Almalki, A. M. (2011). *Blended Learning in Higher Education in Saudi Arabia: A Study of Umm Al-Qura University.* (Doctor of Philosophy), RMIT University.

Almalki, G., & Williams, N. (2012). A strategy to improve the usage of ICT in the Kingdom of Saudi Arabia primary school. *International Journal of Advanced Computer Science and Applications, 3*(10), 8.

AlMegren, A. (2011). *Status of e-learning at several major universities in Saudi Arabia.* Paper presented at the World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education, Honolulu, Hawaii, USA.

Almuqayteeb, T. A. (2009). *Attitudes of female faculty toward the use of computer technologies and the barriers that limit their use of technologies in girls' colleges in saudi arabia.* (Doctor of Philosophy), Mississippi State University.

Alshehri, M., & Drew, S. (2010). Challenges of e-government services adoption in Saudi Arabia from an e-ready citizen perspective. *World Academy of Science, Engineering & Technology, 29*(42), 7.

Alshehri, M. A. (2012). *Using the UTAUT Model to Determine Factors Affecting Acceptance and Use of E-government Services in the Kingdom of Saudi Arabia.* (Doctor of Philosophy), Griffith University.

AlShihi, H. (2006). *Critical Factors in the Adoption and Diffusion of E-government Initiatives in Oman.* (Doctor of Philosophy), Victoria University.

Alshwaier, A., Youssef, A., & Emam, A. (2012). A new Trend for E-learning in KSA using educational clouds. *Advanced Computing: An International Journal (ACIJ), 3*(1), 17. doi: DOI : 10.5121/acij.2012.3107

Altameem, A. (2013). WHAT DRIVES SUCCESSFUL E-LEARNING? AN EMPIRICAL INVESTIGATION OF THE KEY TECHNICAL ISSUES IN SAUDI ARABIAN UNIVERSITIES. *Journal of Theoretical and Applied Information Technology, 53*(1), 8.

Altowjry, A. (2005). *Reforming higher education in Saudi Arabia: The use of telecommunications technology.* (Master of Science in Telecommunications Engineering Technology), Rochester Institute of Technology. Retrieved from http://scholarworks.rit.edu/theses/456

Alwani, A., & Soomro, S. (2010). Barriers to Effective use of Information Technology in Science Education at Yanbu Kingdom of Saudi Arabia. *E-learning experiences and future*, 35-46. doi: 10.5772/8809

Alzamil, Z. A. (2006). Students' perception towards the e-Learning at the GOTEVOT and the Arab Open University in Riyadh. *Journal of King Saud University: Educational Sciences and Islamic Studies, 18*(2), 655-698.

Ashrafi, R., & Murtaza, M. (2008). Use and Impact of ICT on SMEs in Oman. *The electronic journal of information systems evaluation, 11*(3), 125-138.

Asiri, M. J., bt Mahmud, R., Bakar, K. A., & bin Mohd Ayub, A. F. (2012). Factors Influencing the Use of Learning Management System in Saudi Arabian Higher Education: A Theoretical Framework. *Higher Education Studies, 2*(2), 125-137. doi: 10.5539/hes.v2n2p125

Baquero, P., Aguilar, R. M., & Ayala, A. (2006). *Design of the ICT infrastructure of an educational system.* Paper presented at the 2ND WORKSHOP ON Complexity in Design and Engineering, UNIVERSITY OF GLASGOW, SCOTLAND.

Barrett, B. (2009). Using E-Learning as a Strategic Tool for Students with Disabilities: wikieducator.

Bassick, M., McNamara, T., & Sullivan, D. (2012). Employee surveillance: An ethical consideration. In D. McIntosh, R. Drabic, K. Huber, I. Vinogradov & M. Bassick (Eds.), *The Ethical Imperative in the Context of Evolving Technologies* (pp. 77-90): University of Colorado, Leeds School of Business.

Beatty, K. (2013). *Teaching & researching: Computer-assisted language learning*. New York, USA: Routledge.

Beecham, S., Baddoo, N., Hall, T., Robinson, H., & Sharp, H. (2008). Motivation in Software Engineering: A systematic literature review. *Information and software technology, 50*(9), 860-878.

Bell, J. (2000). *Doing Your Research Project: A Guide for First-Time Researchers*. United Kingdom: McGraw-Hill Education (UK).

Berge, Z. L., Muilenburg, L. Y., & Haneghan, J. V. (2002). Barriers to distance education and training: Survey results. *The Quarterly Review of Distance Education*, *3*(4), 409-418.

Berglund, A., Daniels, M., & Pears, A. (2006). *Qualitative research projects in computing education research: an overview.* Paper presented at the Proceedings of the 8th Australasian Conference on Computing Education-Volume 52, Hobart, Tasmania, Australia.

Bingimlas, K. A. (2009). Barriers to the successful integration of ICT in teaching and learning environments: A review of the literature. *Eurasia Journal of Mathematics, Science & Technology Education, 5*(3), 235-245.

BMI. (2015). Retrieved June, 2015, from http://www.bmiresearch.com/

Bøe, T., Gulbrandsen, B., & Sørebø, Ø. (2015). *How to stimulate the continued use of ICT in higher education: Integrating Information Systems Continuance Theory and agency theory*. Computers in Human Behavior, 50, 375-384. http://dx.doi.org/10.1016/j.chb.2015.03.084

Bonk, C. J. (2002). Online training in an online world. *USDLA Journal, 16*(3).

Bowden, L., Fearon, C., Manship, S., Dee, T., & McLaughlin, H. (2014). *Exploring information technology (IT) strategy and processual alignment: an exploratory case study in higher education (HE)*. In: British Academy of Management, 9th-11th September, Belfast

Brenner, M. E. (2006). Interviewing in educational research. In J. L. Green, G. Camilli & P. B. Elmore (Eds.), *Handbook of complementary methods in education research* (3rd ed., pp. 357-370). United States of America: American Educational Research Association.

Brown, C. C. (2015). Integrated Curriculum of the Future: Eliminating a Hidden Curriculum to Unveil a New Era of Collaboration, Practical Training, and Interdisciplinary Learning, The. *Elon L. Rev., 7*, 16.

Bryman, A. (2015). *Social Research Methods*. United Kingdom: Oxford University Press.

Bryman, A., & Burgess, B. (2002). *Analyzing qualitative data*. London, UK: Routledge.

Buabeng-Andoh, C. (2012). Factors influencing teachers' adoption and integration of information and communication technology into teaching: A review of the literature. *International Journal of Education and Development using Information and Communication Technology (IJEDICT), 8*(1), 136-155.

Burns, R. B. (2000). *Introduction to research methods*. Australia: SAGE publications.

Burrell, S. C. (2014). *IT Staff Turnover Intentions, Job Modification, and the Effects of Work Recognition at Large Public Higher Education Institutions*. (DOCTOR OF EDUCATION), Georgia Southern University.

Campanella, S., Dimauro, G., Ferrante, A., Impedovo, D., Impedovo, S., Lucchese, M., . . . Stasolla, E. (2008). E-learning platforms in the Italian Universities: the technological solutions at the University of Bari. *WSEAS TRANSACTIONS ON ADVANCES IN ENGINEERING EDUCATION, 5*(1), 12-19.

Campbell, J. R. (2012). Building an IT Economy: South Korean Science and Technology Policy. *Issues in Technology Innovation, 19*, 9. http://www.brookings.edu/research/papers/2012/09/12-korean-technology-campbell

CDSI. (2014). Statistical Yearbook of Saudi Arabia. *The Central Department of Statistics & Information(CDSI), Ministry of Economy and Planning*

Chatterjee, P., & Nath, A. (2015). The Future ICT Education in India—A Pilot Study on the Vision of Ubiquitous Learning in Higher Education *Information Systems Design and Intelligent Applications* (pp. 599-609): Springer.

Chen, B. (2009). Barriers to adoption of technology-mediated distance education in higher-education institutions. *Quarterly Review of Distance Education*, *10*(4), 333-338.

CIA. (2015). The World Factbook. Retrieved November 2015, from Central Intelligence Agency Library https://www.cia.gov/library/publications/the-world-factbook/

CITC. (2014). ICT Indicators Charts End of Q4 2014. Retrieved October 2015, from Communications and Information Technology Commission

CITC. (2015). Background of Communications and Information Technology Commission Retrieved July, 2015, from http://www.citc.gov.sa/English/AboutUs/Pages/History.aspx

Clark, R. C., & Mayer, R. E. (2011). *E-learning and the science of instruction: Proven guidelines for consumers and designers of multimedia learning*. United States of America: John Wiley & Sons.

Cohen, L., Manion, L., & Morrison, K. (2011). *Research methods in education* (7th ed.). United States of America: Routledge.

Coolican, H. (2014). *Research methods and statistics in psychology*. United States of America: Psychology Press.

Corston, R., & Colman, A. (2002). *One-way analysis of variance*: Wiley-Blackwell.

Coyle, P. (2014). How entrepreneurial leadership can engage university staff in the development of an entrepreneurial culture. *Industry and Higher Education, 28*(4), 263-269. doi: 10.5367/ihe.2014.0215

Creswell, J. W. (2013). *Research design: Qualitative, quantitative, and mixed methods approaches*. United States of America: Sage publications.

Creswell, J. W. (2014). *Educational research: Planning, conducting, and evaluating quantitative*. United States of America: Pearson

Creswell, J. W., & Clark, V. L. P. (2011). *Designing and conducting mixed methods research*. United States of America: SAGE.

Croucher, R., Stumbitz, B., Quinlan, M., & Vickers, I. (2013). Can better working conditions improve the performance of SMEs? An international literature review. Geneva: International Labour Office.

Dahlstrom, E., Grunwald, P., de Boor, T., & Vockley, M. (2011). ECAR National study of students and information technology in higher education, 2011. *EDUCUASE Center for Applied Research*. http://www.educause.edu.

Denzin, N. K., & Lincoln, Y. S. (2011). *The SAGE handbook of qualitative research*. United States of America: Sage.

Devi, L. P., Bimol, S., Saikia, M., & Singh, L. S. (2014). Cloud Technology in Higher Teacher Education Institutions: A Solution to ICT Infraucture adoption problem. *International Journal of Advanced Studies in Computers, Science and Engineering, 3*(4), 28-33.

Dhanarajan, G., & Abeywardena, I. S. (2013). Higher education and open educational resources in Asia: an overview. In G. Dhanarajan & D. Porter (Eds.), *Perspectives on open and distance learning: Open Education Resources: An Asian Perspective* (pp. 3-18): Commonwealth of Learning.

Donn, G., & Issan, S. (2007). Higher education in transition: Gender and change in the Sultanate of Oman. *Scottish Educational Review, 39*(2), 173.

Dreger, C., & Rahmani, T. (2014). The impact of oil revenues on the Iranian economy and the Gulf states. *German Institute for Economic Research,* 1433-0210

Duane, A., & Finnegan, P. (2004). *Managing email usage: A cross case analysis of experiences with electronic monitoring and control.* Paper presented at the Proceedings of the 6th international conference on Electronic commerce (ICEC), Delft, The Netherlands.

Dunn, W. N. (2015). *Public policy analysis*. Routledge.

EUAE. (2015). Education in the UAE. Retrieved July, 2015, from http://www.uae-embassy.org/uae/education-uae

Ewers, M. C. (2015). Oil, human capital and diversification: the challenge of transition in the UAE and the Arab Gulf States. *The Geographical Journal*. doi: 10.1111/geoj.12138

Fabry, D. L., & Higgs, J. R. (1997). Barriers to the effective use of technology in education: Current status. *Journal of educational computing research*, *17*(4), 385-395.

Faiz, M. M. U., & Al-Mutairi, M. S. (2015). *Engineering education for a resilient society: A case study of the kingdom of Saudi Arabia.* Paper presented at the 2015 International Conference on Interactive Collaborative Learning (ICL), Florence, Italy.

Farzandipour, M., & Meidani, Z. (2014). Medical Universities Educational and Research Online Services: Benchmarking Universities' Website Towards E-Government. *Acta Informatica Medica, 22*(3), 189-194. doi: 10.5455/aim.2014.22.189-194

Fee, T. J. (2014). *An online faculty training system proposal for Asbury University.* (Doctor of Education Dissertation), MOREHEAD STATE UNIVERSITY.

Findlow, S. (2013). Higher education and feminism in the Arab Gulf. *British Journal of Sociology of Education, 34*(1), 112-131. doi: 10.1080/01425692.2012.699274

Fox, W. H., & Al Shamisi, S. (2014). United Arab Emirates' education hub: A decade of development. In J. Knight (Ed.), *International Education Hubs: Student, Talent, Knowledge-Innovation Models* (pp. 63-80). United States of America: Springer.

Garg, J., Garg, S. B., & Choudhary, N. (2011). Effective implementation of e-governance in technical institutions in India using ICT to make them world class. *An International Journal of Engineering Sciences, 4*(Sept 2011), 535-543.

GASTAT. (2016). Demography Survey 2016. Retrieved November 2016, from General Authority for Statistics of Saudi Arabia http://www.stats.gov.sa/sites/default/files/en-demographic-research-2016_2.pdf

Gay, L. R., & Mills, G. E. (2015). *Educational research: Competencies for analysis and applications*. United States of America: Pearson Higher Ed.

George, D., & Mallery, P. (2011). *SPSS for windows step by step: A simple guide and reference 18.0 update* United States of America: Pearson

Gikas, J., & Grant, M. M. (2013). Mobile computing devices in higher education: Student perspectives on learning with cellphones, smartphones & social media. *The Internet and Higher Education, 19*, 18-26. doi: 10.1016/j.iheduc.2013.06.002

Gillham, B. (2000). *Case study research methods* (1st ed.). United States of America: Bloomsbury Publishing.

Glenn, M., & D'Agostino, D. (2008). The Future of Higher Education: How Technology Will Shape Learning (pp. 32): The Economist Intelligence Unit 2008.

Guba, E. G., & Lincoln, Y. S. (1994). Competing paradigms in qualitative research. In D. N & L. Y (Eds.), *Handbook of qualitative research* (Vol. 2, pp. 105-117). London, UK: Sage.

Gul, I., Arif, M., & Yousaf, M. J. (2013). *Adoption and diffusion of Information and Communication Technologies in higher education: using structural equation modelling.* Paper presented at the 10th International Conference on Statistical Sciences, Lahore, Pakistan.

Granger, C. A., Morbey, M. L., Lotherington, H., Owston, R. D., & Wideman, H. H. (2002). Factors contributing to teachers' successful implementation of IT. *Journal of Computer Assisted Learning*, *18*(4), 480-488.

Haber, J., & Mills, M. (2008). Perceptions of barriers concerning effective online teaching and policies: Florida community college faculty. *Community College Journal of Research and Practice*, *32*(4-6), 266-283.

Haghighia, S. T., & Eskandari, M. (2012). A study on barriers of using information technology on learning and teaching in elementary schools. *Management Science Letters, 2*(1), 417-424 doi: 10.5267/j.msl.2011.07.003

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate data analysis* (7th ed.). New Jersey: Prentice Hall.

Hall, I. M., & Hall, D. J. (2004). *Evaluation and social research: Introducing small-scale practice*. New York, USA: Palgrave Macmillan.

Hennessy, S., Harrison, D., & Wamakote, L. (2010). Teacher factors influencing classroom use of ICT in sub-Saharan Africa. *Itupale Online Journal of African Studies, 2*(1), 39-54.

Hilmi, M. F., Pawanchik, S., & Mustapha, Y. (2012). Perceptions on Service Quality and Ease-of-Use: Evidence from Malaysian Distance Learners. *Malaysian Journal of Distance Education, 14*(1), 99-110.

Hudson, M., & Kirk, M. (2014). *Gulf Politics and Economics in a Changing World*. Singapore: World Scientific.

Hukoomi. (2015). Retrieved September, 2015, from http://portal.www.gov.qa/wps/portal/homepage

ictQatar. (2015). Background of The Ministry of Transport and Communications (MOTC). Retrieved May, 2015, from http://www.ictqatar.qa/en/about-us

IECHE. (2015). *THE 21ST CENTURY UNIVERSITY*. Paper presented at the The 6th International Exhibition & Conference on Higher Education, Riyadh, Saudi Arabia. http://ieche.com.sa/documents/PrimerBrochure-IECHE%202015.pdf

Ingutia-Oyieke, L. (2008). *Information And Communication Technologies In Teachning And Learning: A Comparative Evaluation Of Two University Libraries In Kenya.* (Master Of Information Science Dissertation), University of Pretoria. Retrieved from http://hdl.handle.net/2263/28120

Ismail, R., Lai, Y. M., Ayub, Z. A., Ahmad, A. R., & Da Wan, C. (2016). *Kingdom of Saudi Arabia Higher Education in the Middle East and North Africa* (pp. 127-146): Springer. 10.1007/978-981-10-1056-9_7.

Jain, P. (2016). *A Study of Role of Internet in Higher Education & Career Building*. Indian Journal of Applied Research, 6(6).

Jamjoom, F. B., & Kelly, P. (2013). Higher Education for Women in the Kingdom of Saudi Arabia. In S. Larry & A. Abouammoh (Eds.), *Higher Education in Saudi Arabia* (pp. 117-125). Netherlands: Springer.

John, S. P. (2015). *The Integration of Information Technology in Higher Education: A Study of Faculty's Attitude Towards IT Adoption in the Teaching Process.* Paper presented at the 14th International Business and Economy Conference (IBEC) Bangkok, Thailand, Bangkok, Thailand.

Johnson, B., & Christensen, L. (2013). *Educational research: Quantitative, qualitative, and mixed approaches* (Fifth ed.). United States of America: Sage.

Joseph, P. M., & Lunt, B. M. (2006). *IT in the middle east: an overview.* Paper presented at the Proceedings of the 7th conference on Information technology education, Minneapolis, MN, USA

Jung, J., & Shin, J. C. (2015). Administrative staff members' job competency and their job satisfaction in a Korean research university. *Studies in Higher Education, 40*(5), 881-901. doi: 10.1080/03075079.2013.865161

Karolak, M. (2012). Bahrain's tertiary education reform: A step towards sustainable economic development. *Revue des mondes musulmans et de la Méditerranée*(131), 163-181. doi: 10.4000/remmm.7665

Kelvin, O. O., Oghenetega, I., & Jackson, A. (2012). A review of issues in information and communication technology (ICT) planning and implementation in academic libraries

in Nigeria. *Library Hi Tech News, 29*(8), 11-17. doi: http://dx.doi.org/10.1108/07419051211287624

Keslinger, F., & Lee, H. (1999). *Foundations of behavioural research: Educational, Psychological and Sociological* (4th ed.): Wadsworth Publishing Co Inc.

KGO. (2015). Civil Universities List. Retrieved July, 2015, from Kuwait Government Online http://www.e.gov.kw/sites/kgoenglish/Pages/CitizensResidents/Education/Universities.aspx

Khaled, K. (2014). *The Effect of Information and Communications Technologies (ICT) in the Jordanian Universities*. Paper presented at the Information and Knowledge Management, Vol.4, No.12, 122-132, ISSN 2224-5758.

Khan, B. H. (2005). *Managing e-learning: Design, delivery, implementation, and evaluation* (1st ed.). United States of America: Idea Group Inc (IGI).

Khan, M. S. H., Hasan, M., & Clement, C. K. (2012). Barriers to the Introduction of ICT into Education in Developing Countries: The Example of Bangladesh. *International Journal of Instruction, 5*(2), 61-80.

Kiser, A. I., Porter, T., & Vequist, D. (2012). Employee monitoring and ethics: Can they co-exist? In A. Cartelli (Ed.), *Current Trends and Future Practices for Digital Literacy and Competence* (pp. 209). United States of America: IGI Global.

Koester, J. (2011). Information Technology and Tomorrow's University: A President's Confessions and Advice. *Educause Review, 46*(1), 34-43.

Krieger, Z. (2007). Saudi Arabia puts its billions behind Western-style higher education. *The Chronicle of Higher Education, 54*(3), A1.

KU. (2009). About Kuwait University. Retrieved July, 2015, from http://kuniv.edu/ku/AboutKU/AboutKU/index.htm

Lach-Smith, B. (2010). *Application of strategic institutional-information technology alignment model in four-year institutions of higher education.* (Doctor of Philosophy Dissertation), Indiana State University, Indiana, United States. Retrieved from http://search.proquest.com/docview/757371935?accountid=10910

Lai, Y. M., Ayub, Z. A., Ahmad, A. R., Da Wan, C., & Ismail, R. (2016). *Republic of Tunisia*. In Higher Education in the Middle East and North Africa (pp. 61-86). Springer Singapore. 10.1007/978-981-10-1056-9_4.

Lim, C. P. (2007). Effective integration of ICT in Singapore schools: Pedagogical and policy implications. *Educational Technology Research and Development, 55*(1), 83-116. doi: 10.1007/s11423-006-9025-2

Linn, M. C. (2004). *Internet environments for science education* (M. C. Linn, E. A. Davis & P. Bel Eds.). United States of America: Routledge.

Louis, C., Lawrence, M., & Keith, M. (2007). Research methods in education. *New York: Routledge*.

Macfarlane, B. (2013). The surveillance of learning: A critical analysis of university attendance policies. *Higher Education Quarterly*, *67*(4), 358-373.

Maguire, L. L. (2005). Literature review–faculty participation in online distance education: Barriers and motivators. *Online journal of distance learning administration*, *8*(1), 1-16.

Malapile, S., & Keengwe, J. (2013). Information Communication Technology planning in developing countries. *Education and Information Technologies, 19*(4), 691-701 doi: 10.1007/s10639-013-9248-x

Marengo, A., & Marengo, V. (2005). Measuring the economic benefits of e-learning: A proposal for a new index for academic environments. *Journal of Information Technology Education, 4*(1), 329-346.

Marshall, C., & Rossman, G. B. (2014). *Designing qualitative research* (Sixth ed.). United States of America: Sage publications.

Mathew, S. (2011). *Impact of Information Communication Technology (ICT) on professional development and educational needs of library professionals in the universities of Kerala.* (Doctor of Philosophy), Cochin University of Science and Technology.

MCIT. (2015). Brief History of the Ministry of Communications and Information Technology. Retrieved July 2015, from http://www.mcit.gov.sa/En/AboutMcit/Pages/BriefHistory.aspx

ME. (2015). Retrieved November 2015, from Ministry of Education in Saudi Arabia http://he.moe.gov.sa/en/Ministry/Excellency-Of-The-Ministe/Pages/default.aspx

Mehra, B., & Bilal, D. (2007). International students' information needs and use of technology. *Proceedings of the American Society for Information Science and Technology, 44*(1), 1-8. doi: 10.1002/meet.1450440373

Mertens, D. M. (2014). *Research and evaluation in education and psychology: Integrating diversity with quantitative, qualitative, and mixed methods* (Fourth ed.). United States of America: Sage Publications.

Meyer, K. A. (2002). Quality in Distance Education: Focus on On-Line Learning. In A. J. Kezar (Ed.), *ASHE-ERIC Higher Education Report* (Vol. 29, pp. 155). Washington, DC., USA: Jossey-Bass.

Meyers, W. (2006). *Equity issues in ICT in higher education: the experience of mature-age rural women.* (Master of Education: Research), University of Wollongong.

MF. (2015). Recent Economic Developments and Highlights of Fiscal Years (2014) & (2015). Retrieved July 2015, from Ministry of Finance in Saudi Arabia https://www.mof.gov.sa/English/DownloadsCenter/Budget/Ministry's%20of%20Finance%20statment%20about%20the%20national%20budget%20for%202015.pdf

MF. (2016). Recent Economic Developments and Highlights of Fiscal Years (2015) & (2016). Retrieved November 2016, from Ministry of Finance in Saudi Arabia https://www.mof.gov.sa/en/docslibrary/Budget/Documents/2016.pdf

Miles, M. B., Huberman, A. M., & Saldana, J. (2013). *Qualitative data analysis: A Methods sourcebook* (3rd ed.). United States of America: Sage Publications, Inc

Minichiello, V., Aroni, R., & Hays, T. (2008). *In-depth interviewing: Principles, techniques, analysis* (Third ed.). Australia: Pearson Education Australia.

Mirza, A. (2007). *Utilizing distance learning technologies to deliver courses in a segregated educational environment.* Paper presented at the EdMedia: World conference on educational multimedia, hypermedia and telecommunications, Vancouver, Canada.

Mirza, A. A., & Al-Abdulkareem, M. (2011). Models of e-learning adopted in the Middle East. *Applied Computing and Informatics, 9*(2), 83-93. doi: 10.1016/j.aci.2011.05.001

Mohammad, M. (2015). *IT Surveillance and Social Implications in the Workplace.* Paper presented at the Proceedings of the 2015 ACM SIGMIS Conference on Computers and People Research, Newport Beach, CA, USA

MOEDU. (2012). Kingdom of Bahrain Higher Education Universities and Institutions Annual Report 2012. Retrieved November, 2016, from The Ministry of Higher Education Council in Bahrain http://moedu.gov.bh/hec/UploadFiles/Reports/HEC%20Annual%20Report%20Single%20Page.pdf

MOHESR. (2015). Retrieved July, 2015, from The Ministry of Education in UAE http://www.mohesr.gov.ae/En/HigherEducation/Pages/AboutHigherEducation.aspx

Moini, J. S., Bikson, T. K., Neu, C. R., & DeSisto, L. (2009). *The Reform of Qatar University. Monograph*. Santa Monica, California, USA: RAND Corporation, RAND-Qatar Policy Institute.

Morakabati, Y., Beavis, J., & Fletcher, J. (2014). Planning for a Qatar Without Oil: Tourism and Economic Diversification, a Battle of Perceptions. *Tourism Planning & Development, 11*(4), 415-434. doi: 10.1080/21568316.2014.884978

Moraru, L. (2012). *Academic internal stakeholder condition: a comparative approach*. Paper presented at the International Conference on Education and Educational Psychology (ICEEPSY 2012), Istanbul, Turkey.

Muilenburg, L. Y., & Berge, Z. L. (2005). Student barriers to online learning: A factor analytic study. *Distance education*, *26*(1), 29-48.

Mungania, P. (2003). The seven e-learning barriers facing employees. *The Masie Centre*.

Naarmala, J. (2009). *ICT and teachers in higher education-A case study on adopting web based training.* (dissertation), Universitas Wasaensis.

Naderi, N., Shiri, N., Tatar, M., & Pirmoradi, A. (2014). THE INFLUENCE OF SOCIAL CAPITAL ON JOB SATISFACTION AMONG THE AGRICULTURE FACULTY MEMBERS IN UNIVERSITY OF TEHRAN, IRAN. *Science International, 26*(2), 953-957.

Natalicio, D. (2000). Information technology: Focusing on improved teaching and learning. *Educause Review, 35*(5), 10-11.

Nawi, H. S. A., Rahman, A. A., & Ibrahim, O. (2011). *Government's ICT project failure factors: A revisit.* Paper presented at the 2011 International Conference on Research and Innovation in Information Systems (ICRIIS'11), Kuala Lumpur, Malaysia.

NCSI. (2016). Higher Education Statistics. Retrieved November, 2016, from the the National Center for Statistics and Information in Sultanate of Oman. Issue 5 https://www.ncsi.gov.om/Elibrary/LibraryContentDoc/bar_Higher%20Education%205%20Issue_f5e1ec38-0aba-48b6-a14d-b46a41cb2d07.pdf

Nord, G. D., McCubbins, T. F., & Nord, J. H. (2006). E-monitoring in the workplace: privacy, legislation, and surveillance software. *Communications of the ACM, 49*(8), 72-77. doi: 10.1145/1145287.1145290

Obaidat, T. (2003). *Scientific Research, concept, tools, methods* (Vol. 31). Amman: Ishrakat for publication and distribution.

OECS. (2011). *Information Technology & Internet Survey: OECS Secondary School Students*. Retrieved from the Education Development Management Unit. http://unpan1.un.org/intradoc/groups/public/documents/tasf/unpan024794.pdf

OHE. (2014). *National Indicators and International Comparisons 2014*. Retrieved from the Observatory on Higher Education http://ohe.gov.sa/Pages/OHEPeriodicReports.aspx?Lang=En&Parm=

Omari, A. (2013). TECHNOLOGY ADOPTION IN THE ARABIAN GULF COUNTRIES: THE CASE OF E-GOVERNMENT. *International Journal of Computer Science, Engineering & Information Technology, 3*(3). doi: 10.5121/ijcseit.2013.3301

Oppenheim, A. N. (2000). *Questionnaire design, interviewing and attitude measurement* (second ed.): Bloomsbury Publishing.

Ormrod, J. E., & Leedy, P. D. (2015). *Practical research: Planning and design* (11th ed.). New Jersey, USA: Pearson.

Ouzts, D. T., & Palombo, M. J. (2004). Technology in Higher Education: A Study of Perceptions of College Professors. *TechTrends: Linking Research & Practice to Improve Learning, 48*(5), 17-22.

Pallant, J. (2016). *SPSS survival manual: A step by step guide to data analysis using IBM SPSS (5. uppl.)* (6th ed.). Australia: ALLEN & UNWIN

Peeraer, J., & Van Petegem, P. (2012). Information and communication technology in teacher education in Vietnam: from policy to practice. *Educational Research for Policy and Practice, 11*(2), 89-103. doi: 10.1007/s10671-011-9106-9

Petko, D. (2008). Oversold–underused revisited: factors influencing computer use in Swiss classrooms. In *Beyond Knowledge: The Legacy of Competence* (pp. 121-122). Springer Netherlands.

Powell, J. J. (2012). Small state, large world, global university: Comparing ascendant national universities in Luxembourg and Qatar. *Current Issues in Comparative Education, 15*(1), 100-113.

PUC. (2015). Private universities council. Retrieved July, 2015, from Minister of Higher Education in Kuwait http://www.puc.edu.kw/en/

Ramayah, T., Ahmad, N. H., & Hong, T. S. (2012). An assessment of e-training effectiveness in multinational companies in Malaysia. *Journal of Educational Technology & Society, 15*(2), 125-137.

Raskind, M., & Stanberry, K. (2009). Assistive technology for kids with Learning Disabilities: An overview. *LD Online, 5*, 1-3.

Reid, P. (2012). Categories for barriers to adoption of instructional technologies. *Education and Information Technologies, 19*(2), 383-407. doi: 10.1007/s10639-012-9222-z

Roberts, F. D., Kelley, C. L., & Medlin, B. D. (2007). FACTORS INFLUENCING ACCOUNTING FACULTY MEMBERS'DECISION TO ADOPT TECHNOLOGY IN THE CLASSROOM. *College Student Journal, 41*(2), 423-435

Robinson-Pant, A. (2014). Globalisation and higher education in the Arab Gulf states. *Compare: A Journal of Comparative and International Education, 44*(4), 681-683. doi: 10.1080/03057925.2012.748570

Salameh, M. G. (2016). *Saudi Arabia's Vision 2030: A Reality or Mirage*. USAEE Working Paper, Forthcoming. Available at SSRN: https://ssrn.com/abstract=2808611.

Salehi, H., & Salehi, Z. (2012). Challenges for Using ICT in Education: Teachers' Insights. *International Journal of e-Education, e-Business, e-Management and e-Learning, 2*(1), 40-43.

Samara, A., Nistrup, A., AL-Rammah, T. Y., & Aro, A. R. (2015). Lack of facilities rather than sociocultural factors as the primary barrier to physical activity among female Saudi university students. *International journal of women's health, 7*, 279–286. doi: 10.2147/IJWH.S80680

Sarkar, S. (2012). The role of information and communication technology (ICT) in higher education for the 21st century. *Science, 1*(1), 30-41.

Shaikh, Z. A., & Khoja, S. A. (2011). Role of ICT in Shaping the Future of Pakistani Higher Education System. *Turkish Online Journal of Educational Technology-TOJET, 10*(1), 149-161.

Shim, T.-Y., Choi, I.-J., Kim, J., & Lee, Y.-H. (2014). *A Study on Information Technology Plan and Status of University 2013*. International Journal of Software Engineering and Its Applications, 8(10), 47-54. http://dx.doi.org/10.14257/ijseia.2014.8.10.05

Shukla, A., & Singh, S. (2015). Facets of academic excellence in management education: conceptualization and instrument development in India. *Studies in Higher Education, 40*(ahead-of-print), 1-17. doi: 10.1080/03075079.2014.999316

Shuva, N. Z. (2010). *Integrating ICT into university curriculum: a proposal for the faculty of arts, university of Dhaka, Bangladesh.* Paper presented at the Proceedings of Informing Science & IT Education Conference (InSITE), Cassino, Italy

Smith, L., & Abouammoh, A. (2013). Higher Education in Saudi Arabia: Conclusions *Higher Education in Saudi Arabia* (pp. 181-190). Netherlands: Springer.

Spangler, M. S., & Tyler, A. Q. (2011). Identifying fit of mission and environment: Applying the American community college model internationally. *New Directions for Higher Education, 2011*(155), 41-52. doi: 10.1002/he.443

Stein, J. A. (2011). Domesticity, Gender and the 1977 Apple II Personal Computer. *Design and Culture, 3*(2), 193-216. doi: 10.2752/175470811X13002771867842

Teddlie, C., & Tashakkori, A. (2009). *Foundations of mixed methods research: Integrating quantitative and qualitative approaches in the social and behavioral sciences*. Los Angeles, USA: Sage Publications Inc.

Tinio, V. L. (2003). *ICT in Education*. USA: United Nations Development Programme-Asia Pacific Development Information Programme.

Torrisi, G. (2012). *Academics' Use of Technology with Face-to-Face Teaching: Factors Predicting the Use of Blended Strategies.* (Doctor of Philosophy), Griffith University.

Torstrick, R. L., & Faier, E. (2009). *Culture and Customs of the Arab Gulf States* (1st ed.). London, UK: Greenwood Publishing Group.

Touray, A., Salminen, A., & Mursu, A. (2013). ICT barriers and critical success factors in developing countries. *The Electronic Journal of Information Systems in Developing Countries, 56*(7), 1-17.

Trends in Higher Education Marketing, Recruitment, and Technology: Report of Hanover Research. (2016). Retrieved from: http://www.hanoverresearch.com/media/Trends-in-Higher-Education-Marketing-Recruitment-and-Technology-2.pdf

UNDESA. (2014). United Nations E-Government Survey 2014, Retrieved May 2015 http://unpan3.un.org/egovkb/Portals/egovkb/Documents/un/2014-Survey/E-Gov_Complete_Survey-2014.pdf

UNDESA. (2016). United Nations E-Government Survey 2016: E-Government for the People, Retrieved November 2016 http://workspace.unpan.org/sites/Internet/Documents/UNPAN96407.pdf

UNESCO. (2009). *A decade of higher education in the Arab States: Achievements & challenges*. Beirut: UNESCO Regional Bureau for Education in the Arab States.

Vaden, J. (2007). *A model assessment tool for classroom technology infrastructure in higher education* (Doctoral dissertation, Texas State University).

Valtonen, T., Hacklin, S., Kontkanen, S., Hartikainen-Ahia, A., Kärkkäinen, S., & Kukkonen, J. (2013). Pre-service teachers' experiences of using social software applications for collaborative inquiry. *Computers & Education, 69*, 85-95. doi: 10.1016/j.compedu.2013.07.001

Vassiliev, A. (2000). *The History of Saudi Arabia*. (2nd ed.). Saqi Books.

Wagner, D. A., Day, B., James, T., Kozma, R. B., Miller, J., & Unwin, T. (2005). Monitoring and Evaluation of ICT in Education Projects: A Handbook for Developing Countries *ICT and Education Series*. Washington DC, USA: InfoDev: Information for Development Program

Walmiki, R., & Ramakrishnegowda, K. (2009). ICT infrastructure in university libraries of Karnataka. *Annals of Library and information studies, 56*(4), 236-241.

Wang, Y.-S. (2003). Assessment of learner satisfaction with asynchronous electronic learning systems. *Information & Management, 41*(1), 75-86. doi: 10.1016/S0378-7206(03)00028-4

Wellington, J. (2015). *Educational research: Contemporary issues and practical approaches* (2nd ed.). USA: Bloomsbury Publishing.

White, G. L. (2013). *A New Value for Information Security Policy Education.* Paper presented at the 2013 Proceedings of the Information Systems Educators Conference, San Antonio, Texas, USA.

Wilkinson, D., & Birmingham, P. (2003). *Using research instruments: A guide for researchers* (First ed.). London, UK: Routledge

Xie, Y., Yin, R., Chang, Y., Wu, W., & Ni, M. (2014). *Current Status and Solutions Towards the Construction and Sharing of Digital Educational Resources in Colleges and Universities.* Paper presented at the 2014 International Conference of Educational Innovation through Technology (EITT), Brisbane, Australia.

Yin, R. K. (2011). *Applications of case study research* (Third ed. Vol. 34). USA: Sage Publications.

Ziaie, P. (2013). *Challenges and issues of ICT industry in developing countries based on a case study of the barriers and the potential solutions for ICT deployment in Iran.* Paper presented at the 2013 International Conference on Computer Applications Technology (ICCAT), Sousse, Tunisia.

APPENDIX A: SURVEYS DATA TABLES

Table A-0-1 Descriptive Statistics for Students Items

#		X^2	*m*	*Sd.*	*Sig.*
Q11	Reliability	41.929	3.3	1.38	0
	Speed	30.567	3.2	1.4	0
Q12/A	Course material via website	441.63	4.1	1.24	0
	Download/stream lecture video	88.797	3.2	1.7	0
	Submit assignment online	80.813	3.2	1.61	0
	Full learning management system	21.284	2.9	1.71	0
Q12/B	University email system	223.7	3.5	1.68	0
	Messaging system	61.18	3.1	1.7	0
	Social network	109.1	3.3	1.71	0
Q12/C	University website	659.6	4.4	1.05	0
	Student enrolment system	457	4	1.45	0
	Publish grades online	547.6	4.1	1.33	0
Q13	Education Services	131.63	3.7	1.24	0
	Communication Services	125.1	3.6	1.23	0
	Administrative Services	108.76	3.5	1.2	0
Q14	Windows or other operating systems	236.11	3.9	1.1	0
	File handling	408.98	4.2	1	0
	Email	311.07	4	1.13	0
	Instant messaging	242.53	3.9	1.2	0
	Web surfing	518.16	4.3	1.01	0
	Spreadsheets	114.6	3.6	1.18	0
	Word processing	203.98	3.9	1.12	0
	Presentation software	172.75	3.8	1.17	0
	Web search engines	390.53	4.1	1.11	0
	Online library resources	17.34	3	1.44	17.3
Q15	Previous study	112.4	3.6	1.35	0
	Workshops provide by university	17.38	3	1.51	0
	Commercial training courses	21.26	3.2	1.48	0
	Self-directed learning	377.6	4	1.32	0
	More practice	445.3	4.1	1.22	0
	Friends or colleagues	160.2	3.7	1.34	0
Q16	Overall computer skill level using university systems	197.4	3.6	1.06	0

Table 0-2 Descriptive Statistics for Faculty members Items

#		X^2	*m*	*Sd.*	*Sig.*
Q11	Reliability	43	3.7	1.16	0
	Speed	26.52	3.5	1.25	0
Q12/A	Course material via website	86.41	3.21	1.8	0
	Download/stream lecture video	50.41	2.79	1.89	0
	Submit assignment online	50.09	3.06	1.76	0
	Full learning management system	29.22	2.42	1.892	0
Q12/B	University email system	199.8	4.08	1.38	0
	Messaging system	33.4	2.79	1.78	0
	Social network	47	2.79	1.88	0
Q12/C	University website	321.19	4.5	1	0
	Student enrolment system	143.29	3.4	1.9	0
	Publish grades online	356.26	4.3	1.38	0
Q13	Education Services	46.24	3.6	1.18	0
	Communication Services	50.89	3.8	1.13	0
	Administrative Services	43.85	3.7	1.14	0
Q14	The university has well-structured ICT policies and guidelines for staff	87.01	4	1.01	0
	I am familiar with the university's ICT policies and guidelines	95.11	3.9	0.99	0
	The university's ICT policies and guidelines are clear and easy to understand	62.65	3.7	1	0
	The university's ICT policies and guidelines are relevant and up to date	41.03	3.5	1.13	0
Q15	Windows or other operating systems	134.13	4.3	0.85	0
	File handling	182.3	4.5	0.68	0
	Email	212.51	4.6	0.71	0
	Instant messaging	151.24	4.4	0.89	0
	Web surfing	208.35	4.5	0.76	0
	Spreadsheets	86.239	4	1.11	0
	Word processing	117.86	4.2	0.9	0
	Presentation software	116.45	4.2	0.97	0
	Web search engines	153.14	4.4	0.85	0
	Online library resources	37.225	3.7	1.37	0
Q16	Previous study	102.4	4.1	1.22	0
	Workshops provide by university	6.873	3.2	1.38	0.14
	Commercial training courses	27.78	3.5	1.35	0
	Self-directed learning	208.1	4.5	0.84	0
	More practice	251.3	4.6	0.75	0
	Friends or colleagues	57.36	3.9	1.18	0
Q19	My campus provides appropriate ICT training for my work	20.606	3.4	1.21	0
	I am encouraged to attend relevant ICT training workshops	20.042	3.4	1.2	0
	I can usually get a place at an ICT training workshop when I need to.	21.662	3.4	1.18	0
	ICT training workshops are usually well presented.	33.986	3.4	1.17	0
	I usually find the content of ICT training workshops valuable.	33.775	3.5	1.12	0

Table 0-3 Descriptive Statistics for Staff Items

#		X^2	*m*	*Sd.*	*Sig.*
Q11	Reliability	23.75	3.6	1.22	0
	Speed	15.24	3.4	1.32	0
Q12/A	University email system	132.93	3.8	1.57	0
	Messaging system	35.60	2.7	1.79	0
	Social network	59.62	3.2	1.83	0
Q12/B	University website	172.01	4.1	1.33	0
	Student enrolment system	56.70	3	1.89	0
	Publish grades online	32.33	1.9	1.93	0
Q13	Communication Services	29.04	3.6	1.27	0
	Administrative Services	31.60	3.4	1.3	0
Q14	The university has well-structured ICT policies and guidelines for staff	59.04	3.4	1.3	0
	I am familiar with the university's ICT policies and guidelines	52.18	3.9	1.08	0
	The university's ICT policies and guidelines are clear and easy to understand	32.93	3.8	0.99	0
	The university's ICT policies and guidelines are relevant and up to date	38.63	3.7	1.14	0
Q15	Windows or other operating systems	78.79	4	0.92	0
	File handling	129.95	4.4	0.84	0
	Email	116.81	4.3	0.87	0
	Instant messaging	47.55	3.8	1.27	0
	Web surfing	119.79	4.3	1.01	0
	Spreadsheets	60.12	4	1.13	0
	Word processing	80.45	4.1	1.03	0
	Presentation software	39.87	3.8	1.21	0
	Web search engines	75.65	4.1	1.1	0
	Online library resources	6.56	2.8	1.43	0
Q16	Previous study	49.87	3.9	1.25	0
	Workshops provide by university	3.92	3	1.5	0.42
	Commercial training courses	26.89	3.6	1.36	0
	Self-directed learning	138.38	4.4	1	0
	More practice	192.00	4.6	0.68	0
	Friends or colleagues	59.78	4	1.15	0
Q19	My campus provides appropriate ICT training for my work	7.55	3.3	1.34	0.11
	I am encouraged to attend relevant ICT training workshops	7.80	3.2	1.29	0.1
	I can usually get a place at an ICT training workshop when I need to.	3.34	3	1.36	0.5
	ICT training workshops are usually well presented.	37.31	3.1	1.14	0
	I usually find the content of ICT training workshops valuable.	23.67	3.3	1.22	0

Table 0-4 Participants' personal computer, Internet and email

Information		Students		Faculty members		Administrative staff	
		No	Yes	No	Yes	No	Yes
		Percent	Percent	Percent	Percent	Percent	Percent
Saudi universities							
Personal Computer	I do not have a computer	74	26	84.1	15.9	76.8	23.2
	Desktop	73.7	26.3	44.9	55.1	47.4	52.6
	Laptop	33.2	66.8	17.8	82.2	30.5	69.5
	Smartphone	22.2	77.8	34.6	65.4	28.4	71.6
	Tablet computer	66.2	33.8	69.2	30.8	58.9	41.1
Internet	Internet connection at home	10.3	89.7	6.5	93.5	16.8	83.2
	High-speed (ADSL)	47.2	52.8	51.4	48.6	51.6	48.4
	Dial-up	90.7	9.3	96.3	3.7	92.6	7.4
	Wi-Fi	43	57	57	43	46.3	53.7
	Mobile phone network (3G)	51.5	48.5	64.5	35.5	55.8	44.2
Email	Having an Email	13.9	86.1	9.3	90.7	17.9	82.1
Gulf States universities							
Personal Computer	I do not have a computer	91.9	8.1	74.3	25.7	76.9	23.1
	Desktop	62.6	37.4	22.9	77.1	23.1	76.9
	Laptop	21.1	78.9	11.4	88.6	23.1	76.9
	Smartphone	26.8	73.2	20	80	15.4	84.6
	Tablet computer	60.2	39.8	51.4	48.6	38.5	61.5
Internet	Internet connection at home	7.3	92.7	2.9	97.1	3.8	96.2
	High-speed (ADSL)	73.2	26.8	62.9	37.1	69.2	30.8
	Dial-up	89.4	10.6	88.6	11.4	96.2	3.8
	Wi-Fi	26.8	73.2	37.1	62.9	26.9	73.1
	Mobile phone network (3G)	52	48	65.7	34.3	57.7	42.3
Email	Having an Email	4.1	95.9	0	100	0	100

Table 0-5 Computer and Internet at university

Information		Students		Faculty members		Administrative staff	
		No	Yes	No	Yes	No	Yes
		Percent	Percent	Percent	Percent	Percent	Percent
Saudi universities							
University Computer	I have access to a PC in a computer suite	44.8	55.2				
	I have access to a PC in the library	56.7	43.3				
	Accessing a university computer			29	71	29.5	70.5
Internet at university	Do not have access to the Internet at university	43.6	56.4	82.2	17.8	29.5	70.5
	Fixed computer in my office			29.9	70.1	17.9	82.1
	Fixed computer in computer suite or library	46.6	53.4	59.8	40.2	69.5	30.5
	Personal laptop connected to wired network	67.8	32.2	72	28	65.3	34.7
	Personal laptop connected to dial-up	78.9	21.1	87.9	12.1	80	20
	Personal laptop or mobile device connected via university Wi-Fi	52.1	47.9	65.4	34.6	55.8	44.2
Gulf States universities							
University Computer	I have access to a PC in a computer suite	8.1	91.9				
	I have access to a PC in the library	6.5	93.5				
	Accessing a university computer			5.7	94.3	15.4	84.6
Internet at university	Do not have access to the Internet at university	78	22	85.7	14.3	92.3	7.7
	Fixed computer in my office			8.6	91.4	3.8	96.2
	Fixed computer in computer suite or library	18.7	81.3	40	60	65.4	34.6
	Personal laptop connected to wired network	56.9	43.1	45.7	54.3	69.2	30.8
	Personal laptop connected to dial-up	74	26	80	20	88.5	11.5
	Personal laptop or mobile device connected via university Wi-Fi	21.1	78.9	37.1	62.9	57.7	42.3

Table 0-6 Internet connection quality at university

Items	Participant	1	2	3	4	5	*M*	*Sd.*
		Percent	Percent	Percent	Percent	Percent		
Saudi universities								
Reliability	Student	21.9	12.4	23.7	21.9	20.1	3.059	1.42
	Faculty member	7.5	8.4	26.2	35.5	22.4	3.569	1.15
	Staff	10.5	13.7	25.3	32.6	17.9	3.337	1.26
Speed	Student	24.2	11.9	24	21.4	18.6	2.986	1.431
	Faculty member	12.1	9.3	30.8	26.2	21.5	3.354	1.26
	Staff	16.8	11.6	25.3	28.4	17.9	3.19	1.33
Gulf States universities								
Reliability	Student	0.8	8.1	20.3	30.1	40.7	4.018	1.008
	Faculty member	2.9	8.6	8.6	28.6	51.4	4.173	1.09
	Staff	0	0	19.2	23.1	57.7	4.385	0.804
Speed	Student	3.3	11.4	22.8	25.2	37.4	3.823	1.153
	Faculty member	5.7	5.7	17.1	34.3	37.1	3.911	1.15
	Staff	0	3.8	19.2	26.9	50	4.228	0.908

Scale: 1= Poor, 2= Fair, 3= Good, 4= Very Good, 5= Excellent

Table A-0-7 The frequency of using educational services

	Participant	0	1	2	3	4	5	*M*	*Sd.*
		Percent	Percent	Percent	Percent	Percent	Percent		
Saudi universities									
Course material via website	Student	4.4	3.1	5.9	11.3	32.2	43	3.9	1.3
	Faculty member	15.9	12.1	5.6	9.3	34.6	22.4	3	1.8
Download/stream lecture video	Student	11.9	13.1	9.8	16.2	24.5	24.5	3	1.7
	Faculty member	20.6	20.6	6.5	13.1	15.9	23.4	2.5	1.9
Submit assignment online	Student	10.8	12.6	11.3	20.6	25	19.6	3	1.6
	Faculty member	13.1	15.9	11.2	15	22.4	22.4	2.9	1.7
Online quiz or exam	Student	22.4	16	12.6	18.8	16.2	13.9	2.3	1.7
	Faculty member	20.6	24.3	12.1	6.5	15	21.5	2.4	1.9
Full learning management system	Student	13.7	17.3	13.4	17.3	20.4	18	2.7	1.7
	Faculty member	22.4	17.8	12.1	11.2	17.8	18.7	2.4	1.9
Gulf States universities									
Course material via website	Student	0.8	0.8	2.4	6.5	25.2	64.2	4.5	0.9
	Faculty member	8.6	8.6	2.9	5.7	22.9	51.4	3.8	1.7
Download/stream lecture video	Student	8.9	10.6	6.5	8.9	26.8	38.2	3.5	1.7
	Faculty member	5.7	14.3	0	14.3	28.6	37.1	3.6	1.6
Submit assignment online	Student	5.7	4.9	5.7	11.4	30.1	42.3	3.8	1.4
	Faculty member	5.7	14.3	0	5.7	31.4	42.9	3.7	1.6
Online quiz or exam	Student	23.6	11.4	6.5	13.8	20.3	24.4	2.7	1.9
	Faculty member	22.9	17.1	5.7	17.1	25.7	11.4	2.4	1.8
Full learning management system	Student	8.9	10.6	10.6	13.8	19.5	36.6	3.3	1.7
	Faculty member	28.6	14.3	2.9	14.3	17.1	22.9	2.5	2

Scale: 0= N/A, 1= Never, 2= Very Rare, 3= Rare, 4= Occasional, 5= Frequent

Table 0-8 The frequency of using communication services

	Participant	0	1	2	3	4	5	*M*	*Sd.*
		Percent	Percent	Percent	Percent	Percent	Percent		
Saudi universities									
University email system	Student	10.3	13.9	8.5	17.5	19.6	30.2	3.1	1.7
	Faculty member	4.7	8.4	1.9	15	24.3	45.8	3.8	1.5
	Staff	9.5	5.3	9.5	13.7	25.3	36.8	3.5	1.6
Discussion board	Student	16.2	22.7	10.1	17	20.1	13.9	2.4	1.7
	Faculty member	22.4	26.2	12.1	18.7	13.1	7.5	2	1.6
	Staff	18.9	33.7	14.7	9.5	8.4	14.7	2	1.7
Messaging system	Student	13.1	12.6	10.8	20.9	17.8	24.7	2.9	1.7
	Faculty member	16.8	13.1	11.2	16.8	23.4	18.7	2.7	1.8
	Staff	11.6	25.3	13.7	10.5	17.9	21.1	2.6	1.8
Social network	Student	11.9	11.1	10.8	16.2	21.6	28.4	3.1	1.7
	Faculty member	21.5	11.2	12.1	6.5	23.4	25.2	2.8	1.9
	Staff	9.5	14.7	12.6	5.3	24.2	33.7	3.2	1.8
Gulf States universities									
University email system	Student	0.8	3.3	3.3	4.1	12.2	76.4	4.5	1
	Faculty member	0	0	2.9	0	5.7	91.4	4.9	0.6
	Staff	0	0	0	0	0	100	5	0
Discussion board	Student	12.2	18.7	12.2	8.9	16.3	31.7	2.9	1.9
	Faculty member	22.9	17.1	14.3	5.7	20	20	2.4	1.9
	Staff	29.6	26.9	7.7	11.5	15.4	11.5	2	1.8
Messaging system	Student	8.7	12.2	8.1	12.2	26	35.8	3.5	1.6
	Faculty member	14.3	14.3	8.6	17.1	14.3	31.4	3	1.9
	Staff	11.5	19.2	11.5	3.8	19.2	34.6	3	1.9
Social network	Student	6.5	12.2	7.3	11.4	21.1	41.5	3.5	1.7
	Faculty member	11.4	17.1	8.6	14.3	28.6	20	2.9	1.7
	Staff	23.1	7.7	7.7	11.5	15.4	34.6	2.9	2

Scale: 0= N/A, 1= Never, 2= Very Rare, 3= Rare, 4= Occasional, 5= Frequent

Table 0-9 The frequency of using administrative services

	Participant	0	1	2	3	4	5	*M*	*Sd.*
		Percent	Percent	Percent	Percent	Percent	Percent		
Saudi universities									
University website	Student	1.8	2.6	3.9	7.7	27.1	57	4.3	1.12
	Faculty member	2.8	0.9	1.9	2.8	26.2	65.4	4.5	1.04
	Staff	6.3	3.2	2.1	8.4	33.7	46.3	4	1.39
Student enrolment system	Student	4.4	5.7	5.7	9.5	27.1	47.7	3.9	1.41
	Faculty member	15.9	14	2.8	6.5	18.7	42.1	3.2	1.96
Publish grades online	Student	5.7	2.6	5.9	8	29.9	47.9	4	1.39
	Faculty member	0.9	5.6	0.9	9.3	8.4	74.8	4.4	1.16
Online payment	Student	13.4	9	8.8	19.6	20.1	29.1	3.1	1.73
	Faculty member	19.6	11.2	13.1	10.3	12.1	33.6	2.9	1.95
	Staff	17.9	9.5	5.3	10.5	29.5	27.4	3.1	1.86
ID smart card	Student	18	16.2	9.5	16	18	22.2	2.7	1.82
	Faculty member	36.4	26.2	6.5	8.4	13.1	9.3	1.6	1.75
	Staff	35.8	18.9	1.1	15.8	12.6	15.8	2	1.93
Building access system	Student	26.8	21.1	9	14.2	14.4	14.4	2.1	1.81
	Faculty member	50.5	18.7	6.5	8.4	8.4	7.5	1.3	1.67
	Staff	38.9	16.8	4.2	8.4	10.5	21.1	2	2.04
Staff self-service system	Faculty member	29	7.5	3.7	8.4	10.3	41.1	2.9	2.17
	Staff	16.8	13.7	6.3	7.4	29.5	26.3	3	1.87
Gulf States universities									
University website	Student	0	0	0	8.1	17.9	74	4.5	0.62
	Faculty member	2.9	0	0	5.7	11.4	80	4.7	0.83
	Staff	0	3.8	0	7.7	7.7	80.8	4.6	0.94
Student enrolment system	Student	8.9	4.9	0.8	1.6	20.3	63.4	4.1	1.6
	Faculty member	2.9	14.3	0	0	25.7	57.1	4	1.54
Publish grades online	Student	1.6	0	1.6	4.1	17.1	75.6	4.6	0.86
	Faculty member	8.6	14.3	0	2.9	2.9	71.4	3.9	1.86
Online payment	Student	17.1	10.6	4.1	7.3	15.4	45.5	3.3	1.97
	Faculty member	17.1	20	0	5.7	14.3	42.9	3.1	2.07
	Staff	19.2	23.1	11.5	0	23.1	23.1	2.5	1.96
ID smart card	Student	17.1	16.3	4.1	8.9	21.1	32.5	3	1.94
	Faculty member	51.4	17.1	2.9	2.9	11.4	14.3	1.5	1.96
	Staff	38.5	23.1	11.5	0	11.5	15.4	1.7	1.91
Building access system	Student	30.1	19.5	6.5	9.8	12.2	22	2.2	1.98
	Faculty member	57.1	14.3	5.7	2.9	2.9	17.1	1.3	1.93
	Staff	42.3	26.9	7.7	0	7.7	15.4	1.5	1.88
Staff self-service system	Faculty member	31.4	11.4	5.7	2.9	8.6	40	2.7	2.24
	Staff	30.8	30.8	0	0	7.7	30.8	2.2	2.18

Scale: 0= N/A, 1= Never, 2= Very Rare, 3= Rare, 4= Occasional, 5= Frequent

Table 0-10 The overall effective of ICT services in university

	Participant	1	2	3	4	5	*M*	*Sd.*
		Percent	Percent	Percent	Percent	Percent		
Saudi universities								
Educational Services	Student	10.1	13.9	20.6	27.1	28.4	3.5	1.3
	Faculty member	6.5	18.7	16.8	34.6	23.4	3.5	1.22
Communication Services	Student	11.9	14.4	20.9	31.2	21.6	3.36	1.29
	Faculty member	3.7	18.7	19.6	32.4	25.2	3.57	1.16
	Staff	13.7	9.5	24.2	34.7	17.9	3.34	1.26
Administrative Services	Student	10.1	13.1	26.5	28.9	21.4	3.38	1.23
	Faculty member	4.7	19.6	17.8	34.6	23.4	3.52	1.18
	Staff	13.7	13.7	17.9	40	14.7	3.28	1.26
Gulf States universities								
Educational Services	Student	2.4	4.9	13	43.1	36.6	4.07	0.95
	Faculty member	0	11.4	5.7	51.4	31.5	4.03	0.92
Communication Services	Student	1.6	2.4	15.4	41.5	39	4.14	0.88
	Faculty member	0	2.9	2.9	45.7	48.6	4.4	0.69
	Staff	0	0	7.7	26.9	65.4	4.58	0.64
Administrative Services	Student	0.8	11.4	17.1	36.6	34.1	3.92	1.02
	Faculty member	0	5.7	14.3	42.9	37.1	4.11	0.86
	Staff	11.5	3.8	7.7	38.5	38.5	3.88	1.3

Scale: 1= Not at all effective, 2= Mostly ineffective, 3= Nor effective or ineffective, 4= Mostly effective, 5= Very effective

Table 0-11 Statements about ICT policy and guidelines at university

	Participant	1	2	3	4	5	*M*	*Sd.*
		Percent	Percent	Percent	Percent	Percent		
Saudi universities								
The university has well-structured ICT policies and guidelines for staff	Faculty member	2.8	7.5	15.9	38.3	35.5	3.96	1.03
	Staff	5.3	9.5	17.9	37.9	29.5	3.77	1.13
I am familiar with the university's ICT policies and guidelines	Faculty member	2.8	13.1	13.1	46.7	24.3	3.77	1.05
	Staff	2.1	9.5	26.3	35.8	26.3	3.75	1.02
The university's ICT policies and guidelines are clear and easy to understand	Faculty member	0.9	17.8	21.5	41.1	18.7	3.59	1.01
	Staff	5.3	15.8	22.1	33.7	23.2	3.5	1.16
The university's ICT policies and guidelines are relevant and up to date	Faculty member	5.6	19.6	23.4	33.6	17.8	3.38	1.15
	Staff	5.3	10.5	31.6	30.5	22.1	3.54	1.1
Gulf States universities								
The university has well-structured ICT policies and guidelines for staff	Faculty member	0	8.6	2.9	40	48.6	4.29	0.89
	Staff	0	0	7.7	42.3	50	4.42	0.64
I am familiar with the university's ICT policies and guidelines	Faculty member	0	0	11.4	54.3	34.3	4.23	0.64
	Staff	0	0	23.1	34.6	42.3	4.19	0.82
The university's ICT policies and guidelines are clear and easy to understand	Faculty member	0	2.9	17.1	42.9	37.1	4.14	0.81
	Staff	0	0	23.1	26.9	50	4.27	0.82
The university's ICT policies and guidelines are relevant and up to date	Faculty member	0	14.3	5.7	51.4	28.6	3.94	0.96
	Staff	0	3.8	15.4	42.3	38.5	4.15	0.83

Scale: 1= Strongly disagree, 2= Disagree, 3= Neither, 4= Agree, 5= Strongly agree

Table A-0-12 Participants' methods of getting skills

	Participant	1	2	3	4	5	*M*	*Sd.*
		Percent	Percent	Percent	Percent	Percent		
Saudi universities								
Previous study	Student	9	9.8	20.9	24.2	36.1	3.69	1.29
	Faculty member	5.6	6.5	12.1	24.3	51.4	4.09	1.18
	Staff	5.3	11.6	20	22.1	41.1	3.82	1.23
Workshops provide by university	Student	27.1	19.3	19.8	14.2	19.6	2.8	1.47
	Faculty member	15.9	21.5	15	28	19.6	3.14	1.38
	Staff	27.4	15.8	16.8	22.1	17.9	2.87	1.48
Commercial training courses	Student	23.5	13.9	19.6	19.3	23.7	3.06	1.49
	Faculty member	13.1	18.7	11.2	32.7	24.3	3.36	1.37
	Staff	10.5	9.5	20	27.4	32.6	3.62	1.31
Self-directed learning	Student	11.3	7.5	15.5	20.4	45.4	3.81	1.37
	Faculty member	0.9	4.7	9.3	24.3	60.7	4.39	0.9
	Staff	3.2	4.2	8.4	29.5	54.7	4.28	1
More practice	Student	9.5	4.6	13.7	22.7	49.5	3.98	1.29
	Faculty member	1.9	0.9	6.5	21.5	69.2	4.55	0.81
	Staff	0	2.1	7.4	26.3	64.2	4.53	0.72
Friends or colleagues	Student	12.1	8.8	18.6	24.7	35.8	3.63	1.36
	Faculty member	8.4	7.5	15.9	35.5	32.7	3.77	1.22
	Staff	5.3	6.3	22.1	23.2	43.2	3.93	1.17
Gulf States universities								
Previous study	Student	17.9	11.4	13	22.8	35	3.46	1.5
	Faculty member	8.6	8.6	14.3	14.3	54.3	3.97	1.36
	Staff	7.7	7.7	11.5	23.1	50	4	1.29
Workshops provide by university	Student	18.7	11.4	7.3	22.8	39.8	3.54	1.55
	Faculty member	17.1	11.4	20	28.6	22.9	3.29	1.4
	Staff	15.4	7.7	26.9	11.5	38.5	3.5	1.47
Commercial training courses	Student	17.9	7.3	15.4	26	33.3	3.5	1.46
	Faculty member	8.6	0	17.1	34.3	40	3.97	1.17
	Staff	19.2	3.8	11.5	26.9	38.5	3.62	1.52
Self-directed learning	Student	6.5	0.8	4.1	19.5	69.1	4.44	1.08
	Faculty member	0	0	2.9	14.3	82.9	4.8	0.47
	Staff	3.8	0	7.7	11.5	76.9	4.58	0.94
More practice	Student	4.1	0.8	4.1	25.2	65.9	4.48	0.93
	Faculty member	0	0	2.9	10	77.1	4.74	0.5
	Staff	0	0	0	23.1	76.9	4.77	0.43
Friends or colleagues	Student	8.1	4.9	10.6	31.7	44.7	4	1.22
	Faculty member	2.9	2.9	20	28.6	45.7	4.11	1.02
	Staff	3.8	3.8	15.4	34.6	42.3	4.08	1.05

Scale: 1= N/A, 2= Not Significant, 3= Somewhat Significant, 4= Significant, 5= Very Significant

Table 0-13 Overall computer skill level for using university system

	Participant	1	2	3	4	5	*M*	*Sd.*
		Percent	Percent	Percent	Percent	Percent		
Saudi universities								
Overall computer skill level using university systems	Student	6.4	11.3	32.5	34.8	14.9	3.4	1.07
	Faculty member	0	2.8	19.3	49.5	28	4.03	0.77
	Staff	3.2	8.4	26.3	51.6	10.5	3.58	0.9
Gulf States universities								
Overall computer skill level using university systems	Student	2.4	1.6	19.5	43.1	33.3	4.03	0.9
	Faculty member	0	0	11.4	48.6	40	4.29	0.66
	Staff	0	0	11.5	61.5	26.9	4.15	0.61

Scale: 1= Non User, 2= Beginner, 3= Moderate, 4= Competent, 5= Expert

Table 0-14 The availability of ICT training workshops in your university

	Participant	1	2	3	4	*M*	*Sd.*
		Percent	Percent	Percent	Percent		
Saudi universities							
Use of productivity applications	Faculty member	24.3	14	18.7	43	2.8	1.23
	Staff	25.3	20	22.1	32.6	2.62	1.18
Use of Internet technologies	Faculty member	27.1	14	23.4	35.5	2.67	1.21
	Staff	31.6	12.6	23.2	32.6	2.57	1.24
Use of educational technology & on-line administrative services	Faculty member	29.9	18.7	25.2	26.2	2.48	1.17
	Staff	31.6	21.1	25.3	22.1	2.38	1.15
Gulf States universities							
Use of productivity applications	Faculty member	11.4	5.7	20	62.9	3.34	1.02
	Staff	15.4	11.5	7.7	65.4	3.23	1.17
Use of Internet technologies	Faculty member	17.1	5.7	14.3	62.9	3.23	1.16
	Staff	19.2	7.7	7.7	65.4	3.19	1.23
Use of educational technology & on-line administrative services	Faculty member	20	11.4	17.1	51.4	3	1.21
	Staff	19.2	15.4	11.5	53.8	3	1.23

Scale: 1= Not Available, 2= Available but places are very restricted, 3= Available but places are not always available, 4= Readily available to all staff who require it

Table 0-15 Participants' opinions about university training courses

	Participant	1	2	3	4	5	*M*	*Sd.*
		Percent	Percent	Percent	Percent	Percent		
Saudi universities								
My campus provides appropriate ICT training for my work	Faculty member	7.5	18.7	27.1	24.3	22.4	3.36	1.23
	Staff	14.7	15.8	23.2	25.3	21.1	3.22	1.34
I am encouraged to attend relevant ICT training workshops	Faculty member	7.5	20.6	25.2	23.4	23.4	3.35	1.25
	Staff	14.7	18.9	26.3	23.2	16.8	3.08	1.3
I can usually get a place at an ICT training workshop when I need to.	Faculty member	6.5	21.5	23.4	28	20.6	3.35	1.21
	Staff	18.9	23.2	24.2	17.9	15.8	2.88	1.34
ICT training workshops are usually well presented.	Faculty member	5.6	16.8	33.6	25.2	18.7	3.35	1.13
	Staff	11.6	13.7	42.1	22.1	10.5	3.06	1.11
I usually find the content of ICT training workshops valuable.	Faculty member	4.7	13.1	31.8	28	22.4	3.5	1.11
	Staff	10.5	11.6	34.7	30.5	12.6	3.23	1.14
Gulf States universities								
My campus provides appropriate ICT training for my work	Faculty member	5.7	8.6	25.7	37.1	22.9	3.63	1.11
	Staff	7.7	11.5	19.2	26.9	34.6	3.69	1.28
I am encouraged to attend relevant ICT training workshops	Faculty member	5.7	8.6	25.7	45.7	14.3	3.54	1.03
	Staff	3.8	15.4	34.6	15.4	30.8	3.54	1.2
I can usually get a place at an ICT training workshop when I need to.	Faculty member	5.7	8.6	34.3	31.4	20	3.51	1.09
	Staff	15.4	7.7	34.6	15.4	26.9	3.31	1.37
ICT training workshops are usually well presented.	Faculty member	5.7	11.4	25.7	45.7	11.4	3.46	1.03
	Staff	11.5	7.7	34.6	26.9	19.2	3.35	1.23
I usually find the content of ICT training workshops valuable.	Faculty member	5.7	11.4	20	37.1	25.7	3.66	1.16
	Staff	15.4	3.8	23.1	19.2	38.5	3.62	1.44

Scale: 1= Strongly disagree, 2= Disagree, 3= Neither, 4= Agree, 5= Strongly agree

APPENDIX B: STUDENT QUESTIONNAIRE (ENGLISH)

Section 1: Information about Your Electronic Devices & Internet Connection

1. Do you have a personal computer? (Please tick one box only for each option).

I do not have a personal computer	□ Yes	□ No
Desktop	□ Yes	□ No
Laptop	□ Yes	□ No
Smartphone	□ Yes	□ No
Tablet computer	□ Yes	□ No

2. How old is the personal computer that you use most often? (Please tick one box only).

□ Less than 1 year old □ 1 year old
□ 2 years old □ 3 year old
□ More than 3 years old (please specify age) ……..

3. How old is your newest computer? (Please tick one box only).

□ Less than 1 year old □ 1 year old
□ 2 years old □ 3 years old
□ More than 3 years old (please specify age) ……..

4. Do you have access to an Internet connection at home?

□ Yes □ No

5. What type of Internet connection do you have at home? (Please tick one box only for each option).

High-speed (ADSL)	□ Yes	□ No
Dial-up	□ Yes	□ No
Wi-Fi	□ Yes	□ No
Mobile phone network (3G)	□ Yes	□ No
Other (please specify) ……..…..….	□ Yes	□ No

6. Do you have an Email?

□ Yes □ No

7. How often do you use a computer for the following activities: (Please tick one box only for each option)

	Several times per day	About once a day	About once a week	About once a month	Less than once a month	Never
Email	□	□	□	□	□	□
Study (homework, assignments, projects, etc.)	□	□	□	□	□	□
Entertainment (games, movies, etc.)	□	□	□	□	□	□
Business (accounts, payroll, etc.)	□	□	□	□	□	□
Reading (e-book, e-magazine, etc.)	□	□	□	□	□	□
Social network (Twitter, Facebook, etc.)	□	□	□	□	□	□
Other (please specify) …...……....…....	□	□	□	□	□	□

8. How significant are the following factors in limiting your present and future use of computers and Internet? (Please tick one box only for each option)

	Very Significant	Significant	Somewhat Significant	Not Significant	N/A
Security or privacy concerns	□	□	□	□	□
Not enough time	□	□	□	□	□

I don't have a computer that I can easily access	☐	☐	☐	☐	☐
Internet connection cost too much	☐	☐	☐	☐	☐
Internet connection unreliable	☐	☐	☐	☐	☐
Not interested in technology	☐	☐	☐	☐	☐
I don't have the technical support I need	☐	☐	☐	☐	☐
Family, culture and authority figure reasons	☐	☐	☐	☐	☐
I don't have the necessary skills	☐	☐	☐	☐	☐
Cost of computers too high	☐	☐	☐	☐	☐
Other (please specify) …..……..	☐	☐	☐	☐	☐

Section 2: Information about Your University's Devices & Internet Connection

9. Do you have access to a university computer? (Please tick one box only for each option).

I have access to a PC in a student computer suite	☐ Yes	☐ No
I have access to a PC in the library	☐ Yes	☐ No
Other (please specify) …….	☐ Yes	☐ No

10. How do you connect to the Internet at university? (Please tick one box only for each option).

Do not have access to the Internet at university	☐ Yes	☐ No
Fixed computer in computer suite or library	☐ Yes	☐ No
Personal laptop connected to wired network	☐ Yes	☐ No
Personal laptop connected to dial-up	☐ Yes	☐ No
Personal laptop or mobile device connected via university Wi-Fi	☐ Yes	☐ No
Other (please specify) …….	☐ Yes	☐ No

11. Please rate the following aspects of your internet connection at university: (Please tick one box only for each option).

	Excellent	Very Good	Good	Fair	Poor
Reliability	☐	☐	☐	☐	☐
Speed	☐	☐	☐	☐	☐

12. For the following services, please indicate your use of the service: (Please tick one box only for each option).

	Frequent	Occasional	Rare	Very Rare	Never	N/A
Educational Services						
Access course material via website	☐	☐	☐	☐	☐	☐
Download/stream lecture video	☐	☐	☐	☐	☐	☐
Submit assignment online	☐	☐	☐	☐	☐	☐
Do online quiz or exam	☐	☐	☐	☐	☐	☐
Full learning management system	☐	☐	☐	☐	☐	☐
Other (please specify) …….	☐	☐	☐	☐	☐	☐
Communication Services						
University email system	☐	☐	☐	☐	☐	☐
Discussion board	☐	☐	☐	☐	☐	☐
Messaging system (SMS, etc.)	☐	☐	☐	☐	☐	☐
Social network (Twitter, Facebook, etc.)	☐	☐	☐	☐	☐	☐
Other (please specify) ……	☐	☐	☐	☐	☐	☐
Administrative Services						
University website	☐	☐	☐	☐	☐	☐
Enroll topics online	☐	☐	☐	☐	☐	☐
Publish student grades online	☐	☐	☐	☐	☐	☐
Online payment (printing, parking, etc.)	☐	☐	☐	☐	☐	☐
ID student smart card	☐	☐	☐	☐	☐	☐
Building access system	☐	☐	☐	☐	☐	☐
Other (please specify) ……..…	☐	☐	☐	☐	☐	☐

13. For those ICT services that are available at your university, please indicate how effective you think they are: (Please tick one box only for each option).

	Very effective	Mostly effective	Nor effective or ineffective	Mostly ineffective	Not at all effective
Educational Services	☐	☐	☐	☐	☐
Communication Services	☐	☐	☐	☐	☐
Administrative Services	☐	☐	☐	☐	☐

Section 3: Information about Your Computer Skills

14. Please rate your skill level in each of the following types of software: (Please tick one box only for each option).

	Expert	Competent	Moderate	Beginner	Non User
Windows or other operating systems	☐	☐	☐	☐	☐
File handling (creating/opening files, etc.)	☐	☐	☐	☐	☐
Email	☐	☐	☐	☐	☐
Instant messaging	☐	☐	☐	☐	☐
Web surfing	☐	☐	☐	☐	☐
Spreadsheets (Excel, etc.)	☐	☐	☐	☐	☐
Word processing (Word, etc.)	☐	☐	☐	☐	☐
Presentation software (PowerPoint, etc.)	☐	☐	☐	☐	☐
Web search engines (Google, etc.)	☐	☐	☐	☐	☐
Graphics (Photoshop, Flash, etc.)	☐	☐	☐	☐	☐
Creating web pages (Dreamweaver, FrontPage, etc.)	☐	☐	☐	☐	☐
Online library resources	☐	☐	☐	☐	☐

15. How did you get this level of skill? (Please tick one box only for each option).

	Very Significant	Significant	Somewhat Significant	Not Significant	N/A
Courses in High School	☐	☐	☐	☐	☐
University's courses	☐	☐	☐	☐	☐
Workshops provide by university	☐	☐	☐	☐	☐
Commercial training courses	☐	☐	☐	☐	☐
Self-directed learning	☐	☐	☐	☐	☐
More practice	☐	☐	☐	☐	☐
Friends or colleagues	☐	☐	☐	☐	☐
Other (please specify) ……	☐	☐	☐	☐	☐

16. How would you rate your overall computer skill level using university systems? (Please tick one box only).

Expert	Competent	Moderate	Beginner	Non Use
☐	☐	☐	☐	☐

Section 4: Information about Your Opinion

17. Which one of the following statements best describes your attitude to adopting new technologies? (Please tick one box only).

☐ I am sceptical of new technologies and use them only when I have to
☐ I am usually one of the last people I know to use new technologies
☐ I usually use new technologies when most people I know do
☐ I like new technologies and use them before most people I know
☐ I love new technologies and am among the first to experiment with and use them

18. Which one of the following statements best describes your preference with regard to the use of technology in your classes? (Please tick one box only).

□ I prefer taking classes that use no information technology
□ I prefer taking classes that use limited technology features
□ I prefer taking classes that use a moderate level of technology
□ I prefer taking classes that use technology extensively
□ I prefer taking classes that are delivered entirely "on-line" with no required face-to-face interactions

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19. How have you benefited from the use of ICT in your study. (Please tick one box only for each option).

	Strongly agree	Agree	Neither	Disagree	Strongly disagree
ICT promotes active engagement in class activities	□	□	□	□	□
ICT improves learning and knowledge about study area	□	□	□	□	□
ICT saves time in completing assessable work	□	□	□	□	□
ICT provides access to more information and resources	□	□	□	□	□
ICT helps manage study activities	□	□	□	□	□
Using ICT develop ICT skills for the workplace	□	□	□	□	□

---

20. Please suggest other ways in which use of ICT has benefitted your study.

……
……
……

---

21. Rate the following statements on how effective they would be for increasing your use of ICT at home. (Please tick one box only for each option).

	Very effective	Effective	Neither	Ineffective	Strongly ineffective
More reliable Internet connections	□	□	□	□	□
Cheaper Internet connections	□	□	□	□	□
Wider availability of wireless Internet connection	□	□	□	□	□
Information for parents and authority figure about positive aspects of ICT	□	□	□	□	□
Better support from computer and Internet providers	□	□	□	□	□
More information about setting up and maintaining home ICT	□	□	□	□	□
Active promotion of the benefits of using IT facilities in university study	□	□	□	□	□
Government legislation to protect users from cybercrimes	□	□	□	□	□

---

22. Please suggest other changes that you think would increase your use of ICT at home.

……
……
……

---

23. Rate the following statements on how effective they would be for increasing your use of ICT at university. (Please tick one box only for each option).

	Very effective	Effective	Neither	Ineffective	Strongly ineffective
More networked PCs and student IT suites	□	□	□	□	□
Longer opening hours and weekend opening for IT suites	□	□	□	□	□
Wider availability of wireless connection	□	□	□	□	□
Readily available training about the use of ICT systems	□	□	□	□	□
Early introduction of ICT training into course programs	□	□	□	□	□
Better support from university ICT staff	□	□	□	□	□
Strong encouragement from faculty members to use ICT tools	□	□	□	□	□

Active promotion of the benefits of using IT facilities in university study	□	□	□	□	□

24. Please suggest other changes that you think would increase your use of ICT at university?

……
……
……

25. If you have any other comments or insights about your experience with ICT at home or university, please feel free to share them with us below.

……
……
……
……

Section 5: Personal Information

26. Which city or region does your family come from?

……

27. What is your class standing? (Please tick one box only).

□ First year
□ Second year
□ Third year
□ Fourth year
□ Graduate study

28. Where do you live while attending university? (Please tick one box only).

□ On campus
□ Apartment
□ Share house
□ With my family
□ Other (please specify) ……..

29. What is your gender?

□ Male
□ Female

30. What is your age? (Please tick one box only).

□ 18 – 24 years
□ 25 – 29 years
□ 30 – 34 years
□ 35 – 39 years
□ 40 – 44 years
□ 45 years and over

****END SURVEY THANK YOU****

APPENDIX C: FACULTY MEMBER QUESTIONNAIRE (ENGLISH)

Section 1: Information about Your Electronic Devices & Internet Connection

1. Do you have a personal computer? (Please tick one box only for each option).

I do not have a personal computer	☐ Yes	☐ No
Desktop	☐ Yes	☐ No
Laptop	☐ Yes	☐ No
Smartphone	☐ Yes	☐ No
Tablet computer	☐ Yes	☐ No

2. How old is the personal computer that you use most often? (Please tick one box only).

☐ Less than 1 year old ☐ 1 year old
☐ 2 years old ☐ 3 year old
☐ More than 3 years old (please specify age) ……..

3. How old is your newest computer? (Please tick one box only).

☐ Less than 1 year old ☐ 1 year old
☐ 2 years old ☐ 3 years old
☐ More than 3 years old (please specify age) ……..

4. Do you have access to an Internet connection at home?

☐ Yes ☐ No (go to 6)

5. What type of Internet connection do you have at home? (Please tick one box only for each option).

High-speed (ADSL)	☐ Yes	☐ No
Dial-up	☐ Yes	☐ No
Wi-Fi	☐ Yes	☐ No
Mobile phone network (3G)	☐ Yes	☐ No
Other (please specify) …….……..….	☐ Yes	☐ No

6. Do you have an Email?

☐ Yes ☐ No

7. How often do you use a computer for the following activities: (Please tick one box only for each option)

	Several times per day	About once a day	About once a week	About once a month	Less than once a month	Never
Email	☐	☐	☐	☐	☐	☐
Teaching (homework, assignments, projects, etc.)	☐	☐	☐	☐	☐	☐
Entertainment (games, movies, etc.)	☐	☐	☐	☐	☐	☐
Business (accounts, payroll, etc.)	☐	☐	☐	☐	☐	☐
Reading (e-book, e-magazine, etc.)	☐	☐	☐	☐	☐	☐
Social network (Twitter, Facebook, etc.)	☐	☐	☐	☐	☐	☐
Other (please specify) …...…….....…..	☐	☐	☐	☐	☐	☐

8. How significant are the following factors in limiting your present and future use of computers and Internet? (Please tick one box only for each option)

	Very Significant	Significant	Somewhat Significant	Not Significant	N/A
Security or privacy concerns	☐	☐	☐	☐	☐
Not enough time	☐	☐	☐	☐	☐
I don't have a computer that I can easily access	☐	☐	☐	☐	☐
Internet connection cost too much	☐	☐	☐	☐	☐
Internet connection unreliable	☐	☐	☐	☐	☐
Not interested in technology	☐	☐	☐	☐	☐
I don't have the technical support I need	☐	☐	☐	☐	☐
Family, culture and authority figure reasons	☐	☐	☐	☐	☐
I don't have the necessary skills	☐	☐	☐	☐	☐
Cost of computers too high	☐	☐	☐	☐	☐
Other (please specify) …..……..	☐	☐	☐	☐	☐

Section 2: Information about Your University's Devices & Internet Connection

9. Do you have access to a university computer?

☐ Yes ☐ No

10. How do you connect to the Internet at university? (Please tick one box only for each option).

Do not have access to the Internet at university	☐ Yes	☐ No
Fixed computer in my office	☐ Yes	☐ No
Fixed computer in computer suite or library	☐ Yes	☐ No
Personal laptop connected to wired network	☐ Yes	☐ No
Personal laptop connected to dial-up	☐ Yes	☐ No
Personal laptop or mobile device connected via university Wi-Fi	☐ Yes	☐ No
Other (please specify) …….	☐ Yes	☐ No

11. Please rate the following aspects of your internet connection at university: (Please tick one box only for each option).

	Excellent	Very Good	Good	Fair	Poor
Reliability	☐	☐	☐	☐	☐
Speed	☐	☐	☐	☐	☐

12. For the following services, please indicate your use of the service: (Please tick one box only for each option).

	Frequent	Occasional	Rare	Very Rare	Never	Not Available
Educational Services						
Offer course material on the website	☐	☐	☐	☐	☐	☐
Download/stream lecture video	☐	☐	☐	☐	☐	☐
Submitting student assignments	☐	☐	☐	☐	☐	☐
Student online quiz or exam	☐	☐	☐	☐	☐	☐
Full learning management system	☐	☐	☐	☐	☐	☐
Other (please specify) ……	☐	☐	☐	☐	☐	☐
Communication Services						
University email system	☐	☐	☐	☐	☐	☐
Discussion board	☐	☐	☐	☐	☐	☐
Messaging system (SMS, etc.)	☐	☐	☐	☐	☐	☐
Social network (Twitter, Facebook, etc.)	☐	☐	☐	☐	☐	☐
Other (please specify) ……	☐	☐	☐	☐	☐	☐
Administrative Services						
University website	☐	☐	☐	☐	☐	☐
Online student enrollment system	☐	☐	☐	☐	☐	☐
Publish student grades online	☐	☐	☐	☐	☐	☐

Online payment (printing, parking, etc.)	☐	☐	☐	☐	☐	☐
ID faculty member smart card	☐	☐	☐	☐	☐	☐
Building access system	☐	☐	☐	☐	☐	☐
Faculty member self-service system	☐	☐	☐	☐	☐	☐
Faculty member web page	☐	☐	☐	☐	☐	☐
Other (please specify) ……	☐	☐	☐	☐	☐	☐

13. For those ICT services that are available at your university, please indicate how effective you think they are: (Please tick one box only for each option).

	Very effective	Mostly effective	Nor effective or ineffective	Mostly ineffective	Not at all effective
Educational Services	☐	☐	☐	☐	☐
Communication Services	☐	☐	☐	☐	☐
Administrative Services	☐	☐	☐	☐	☐

14. To what extent do you agree with the following statements about ICT policy and guidelines at university? (Please tick one box only for each option).

	Strongly agree	Agree	Neither	Disagree	Strongly disagree
The university has well-structured ICT policies and guidelines for staff	☐	☐	☐	☐	☐
I am familiar with the university's ICT policies and guidelines	☐	☐	☐	☐	☐
The university's ICT policies and guidelines are clear and easy to understand	☐	☐	☐	☐	☐
The university's ICT policies and guidelines are relevant and up to date	☐	☐	☐	☐	☐

Section 3: Information about Your Computer Skills

15. Please rate your skill level in each of the following types of software: (Please tick one box only for each option).

	Expert	Competent	Moderate	Beginner	Non User
Windows or other operating systems	☐	☐	☐	☐	☐
File handling (creating/opening files, etc.)	☐	☐	☐	☐	☐
Email	☐	☐	☐	☐	☐
Instant messaging	☐	☐	☐	☐	☐
Web surfing	☐	☐	☐	☐	☐
Spreadsheets (Excel, etc.)	☐	☐	☐	☐	☐
Word processing (Word, etc.)	☐	☐	☐	☐	☐
Presentation software (PowerPoint, etc.)	☐	☐	☐	☐	☐
Web search engines (Google, etc.)	☐	☐	☐	☐	☐
Graphics (Photoshop, Flash, etc.)	☐	☐	☐	☐	☐
Creating web pages (Dreamweaver, FrontPage, etc.)	☐	☐	☐	☐	☐
Online library resources	☐	☐	☐	☐	☐

16. How did you get this level of skill? (Please tick one box only for each option).

	Very Significant	Significant	Somewhat Significant	Not Significant	N/A
Previous study	☐	☐	☐	☐	☐
Workshops provide by university	☐	☐	☐	☐	☐
Commercial training courses	☐	☐	☐	☐	☐
Self-directed learning	☐	☐	☐	☐	☐
More practice	☐	☐	☐	☐	☐
Friends or colleagues	☐	☐	☐	☐	☐
Other (please specify) ……	☐	☐	☐	☐	☐

17. How would you rate your overall computer skill level using university systems? (Please tick one box only).

Expert	Competent	Moderate	Beginner	Non Use
□	□	□	□	□

18. Please indicate the availability of the following kinds of ICT training workshops in your university: (Please tick one box only for each option).

	Readily available to all staff who require it	Available but places are not always available	Available but places are very restricted	Not available
Use of productivity applications such as Microsoft Word, Excel, and PowerPoint	□	□	□	□
Use of Internet technologies such as email, messaging, and web browsing	□	□	□	□
Use of educational technology such as learning management systems and on-line assessment	□	□	□	□

19. If you university provides ICT training workshops for staff, please indicate the extent to which you agree with the following statements. (Please tick one box only for each option).

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
My campus provides appropriate ICT training for my work.	□	□	□	□	□
I am encouraged to attend relevant ICT training workshops.	□	□	□	□	□
I can usually get a place at an ICT training workshop when I need to.	□	□	□	□	□
ICT training workshops are usually well presented.	□	□	□	□	□
I usually find the content of ICT training workshops valuable.	□	□	□	□	□

Section 4: Information about Your Opinion

20. Which one of the following statements best describes your attitude to adopting new technologies? (Please tick one box only).

□ I am sceptical of new technologies and use them only when I have to
□ I am usually one of the last people I know to use new technologies
□ I usually use new technologies when most people I know do
□ I like new technologies and use them before most people I know
□ I love new technologies and am among the first to experiment with and use them

21. Which one of the following statements best describes your preference with regard to the use of technology in your classes? (Please tick one box only).

□ I prefer taking classes that use no information technology
□ I prefer taking classes that use limited technology features
□ I prefer taking classes that use a moderate level of technology
□ I prefer taking classes that use technology extensively
□ I prefer taking classes that are delivered entirely “on-line” with no required face-to-face interactions

22. How have you benefited from using ICT in your work. (Please tick one box only for each option).

	Strongly agree	Agree	Neither	Disagree	Strongly disagree
ICT promotes active engagement of students in class activities	□	□	□	□	□
ICT improves the teacher's ability to convey knowledge about the teaching area	□	□	□	□	□
ICT saves the teacher's time in preparing lectures and other classroom materials	□	□	□	□	□
ICT provides access to more extensive and up-to-data information and resources	□	□	□	□	□

ICT helps the teacher manage class information and teaching activities	□	□	□	□	□
ICT enables easier sharing of teaching materials between colleagues	□	□	□	□	□

23. Please suggest other ways in which you think use of ICT can benefit teaching.

……
……
……

24. Rate the following statements on how effective they would be for changing your opinion on the use of ICT in teatching. (Please tick one box only for each option).

	Very effective	Effective	Neither	Ineffective	Strongly ineffective
Not enough time to learn necessary new ICT skills	□	□	□	□	□
No need to change; existing teaching methods work well enough	□	□	□	□	□
Lack of encouragement from school or university	□	□	□	□	□
Inadequate ICT support	□	□	□	□	□
Limited or no access to appropriate computer or Internet	□	□	□	□	□
Limited or no access to appropriate software	□	□	□	□	□
Don't know how to use the software	□	□	□	□	□
Don't understand (or don't believe) the potential benefits of ICT	□	□	□	□	□

25. Please suggest other factors that you think prevent effective use of ICT in teaching.

……
……
……

26. Rate the following statements on how effective they would be for increasing your use of ICT at home. (Please tick one box only for each option).

	Very effective	Effective	Neither	Ineffective	Strongly ineffective
More reliable Internet connections	□	□	□	□	□
Cheaper Internet connections	□	□	□	□	□
Wider availability of wireless Internet connection	□	□	□	□	□
Information for parents and authority figure about positive aspects of ICT	□	□	□	□	□
Better support from computer and Internet providers	□	□	□	□	□
More information about setting up and maintaining home ICT	□	□	□	□	□
Active promotion of the benefits of using IT facilities in university teaching	□	□	□	□	□
Government legislation to protect users from cybercrimes	□	□	□	□	□

27. Please suggest other changes that you think would increase your use of ICT at home.

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……

28. Rate the following statements on how effective they would be for increasing your use of ICT at university. (Please tick one box only for each option).

	Very effective	Effective	Neither	Ineffective	Strongly ineffective
Provide PCs or laptops for faculty members	☐	☐	☐	☐	☐
Wider availability of wireless connection	☐	☐	☐	☐	☐
Readily available training about the use of ICT systems	☐	☐	☐	☐	☐
Early introduction of ICT training into induction	☐	☐	☐	☐	☐
Better support from university ICT staff	☐	☐	☐	☐	☐
Stronger encouragement from university and Ministry of higher education leaders to use ICT tools	☐	☐	☐	☐	☐
Change university strategies to spend more funds on IT fields in university	☐	☐	☐	☐	☐
Active promotion of the benefits of using IT facilities in university study	☐	☐	☐	☐	☐
Provide ICT support in each department	☐	☐	☐	☐	☐

29. Please suggest other changes that you think would increase your use of ICT at university?

……
……
……

30. Rate the following statements on how effective they would be for increasing students use of ICT at university. (Please tick one box only for each option).

	Very effective	Effective	Neither	Ineffective	Strongly ineffective
More networked PCs and student IT suites for students	☐	☐	☐	☐	☐
Longer opening hours and weekend opening for IT suites for students	☐	☐	☐	☐	☐
Wider availability of wireless connection	☐	☐	☐	☐	☐
Readily available training about the use of ICT systems	☐	☐	☐	☐	☐
Early introduction of ICT training into course programs	☐	☐	☐	☐	☐
Better support from university ICT staff	☐	☐	☐	☐	☐
Strong encouragement from faculty members to use ICT tools	☐	☐	☐	☐	☐
Active promotion of the benefits of using IT facilities in university teaching	☐	☐	☐	☐	☐

31. Please suggest other changes that you think would increase students use of ICT at university?

……
……
……

32. If you have any other comments or insights about your experience with ICT at home or university, please feel free to share them with us below.

……
……
……
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Section 5: Personal Information

33. What course do you teach?

……

34. Where are you residing?

□ On campus □ Off campus

---

35. What is your gender?

□ Male □ Female

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36. What is your age? (Please tick one box only).

□ 18 – 24 years □ 25 – 29 years
□ 30 – 34 years □ 35 – 39 years
□ 40 – 44 years □ 45 years and over

---

37. Approximately how long have you been teaching? (Please tick one box only).

□ 1-5 years □ 6-10 years
□ 10-20 years □ More than 20 years

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38. What is your educational qualification? (Please tick one box only).

□ Diploma □ Bachelor
□ Master □ PhD

****END SURVEY THANK YOU****

APPENDIX D: ADMINISTRATIVE STAFF QUESTIONNAIRE (ENGLISH)

Section 1: Information about Your Electronic Devices & Internet Connection

1. Do you have a personal computer? (Please tick one box only for each option).

I do not have a personal computer	☐ Yes	☐ No
Desktop	☐ Yes	☐ No
Laptop	☐ Yes	☐ No
Smartphone	☐ Yes	☐ No
Tablet computer	☐ Yes	☐ No

2. How old is the personal computer that you use most often? (Please tick one box only).

☐ Less than 1 year old ☐ 1 year old
☐ 2 years old ☐ 3 year old
☐ More than 3 years old (please specify age) ……..

3. How old is your newest computer? (Please tick one box only).

☐ Less than 1 year old ☐ 1 year old
☐ 2 years old ☐ 3 years old
☐ More than 3 years old (please specify age) ……..

4. Do you have access to an Internet connection at home?

☐ Yes ☐ No

5. What type of Internet connection do you have at home? (Please tick one box only for each option).

High-speed (ADSL)	☐ Yes	☐ No
Dial-up	☐ Yes	☐ No
Wi-Fi	☐ Yes	☐ No
Mobile phone network (3G)	☐ Yes	☐ No
Other (please specify) …….……..….	☐ Yes	☐ No

6. Do you have an Email?

☐ Yes ☐ No

7. How often do you use a computer for the following activities: (Please tick one box only for each option)

	Several times per day	About once a day	About once a week	About once a month	Less than once a month	Never
Email	☐	☐	☐	☐	☐	☐
University-related work and other duties	☐	☐	☐	☐	☐	☐
Entertainment (games, movies, etc.)	☐	☐	☐	☐	☐	☐
Business (accounts, payroll, etc.)	☐	☐	☐	☐	☐	☐
Reading (e-book, e-magazine, etc.)	☐	☐	☐	☐	☐	☐
Social network (Twitter, Facebook, etc.)	☐	☐	☐	☐	☐	☐
Other (please specify) …...…….....…...	☐	☐	☐	☐	☐	☐

8. How significant are the following factors in limiting your present and future use of computers and Internet? (Please tick one box only for each option)

	Very Significant	Significant	Somewhat Significant	Not Significant	N/A
Security or privacy concerns	☐	☐	☐	☐	☐
Not enough time	☐	☐	☐	☐	☐
I don't have a computer that I can easily access	☐	☐	☐	☐	☐
Internet connection cost too much	☐	☐	☐	☐	☐
Internet connection unreliable	☐	☐	☐	☐	☐
Not interested in technology	☐	☐	☐	☐	☐
I don't have the technical support I need	☐	☐	☐	☐	☐
Family, culture and authority figure reasons	☐	☐	☐	☐	☐
I don't have the necessary skills	☐	☐	☐	☐	☐
Cost of computers too high	☐	☐	☐	☐	☐
Other (please specify) …..……..	☐	☐	☐	☐	☐

Section 2: Information about Your University's Devices & Internet Connection

9. Do you have access to a university computer in your office?

☐ Yes ☐ No

10. How do you connect to the Internet at university? (Please tick one box only for each option).

Have access to the Internet at university	☐ Yes	☐ No
Fixed computer in my office	☐ Yes	☐ No
Fixed computer in computer suite or library	☐ Yes	☐ No
Personal laptop connected to wired network	☐ Yes	☐ No
Personal laptop connected to dial-up	☐ Yes	☐ No
Personal laptop or mobile device connected via university Wi-Fi	☐ Yes	☐ No
Other (please specify) …….	☐ Yes	☐ No

11. Please rate the following aspects of your internet connection at university: (Please tick one box only for each option).

	Excellent	Very Good	Good	Fair	Poor
Reliability	☐	☐	☐	☐	☐
Speed	☐	☐	☐	☐	☐

12. For the following services, please indicate your use of the service: (Please tick one box only for each option).

	Frequent	Occasional	Rare	Very Rare	Never	Not Available
Communication Services						
University email system	☐	☐	☐	☐	☐	☐
Discussion board	☐	☐	☐	☐	☐	☐
Messaging system (SMS, etc.)	☐	☐	☐	☐	☐	☐
Social network (Twitter, Facebook, etc.)	☐	☐	☐	☐	☐	☐
Other (please specify) ……	☐	☐	☐	☐	☐	☐
Administrative Services						
University website	☐	☐	☐	☐	☐	☐
Online payment (printing, parking, etc.)	☐	☐	☐	☐	☐	☐
ID staff smart card	☐	☐	☐	☐	☐	☐
Building access system	☐	☐	☐	☐	☐	☐
Staff self-service system	☐	☐	☐	☐	☐	☐
Other (please specify) ……..…	☐	☐	☐	☐	☐	☐

13. For those ICT services that are available at your university, please indicate how effective you think they are: (Please tick one box only for each option).

	Very effective	Mostly effective	Nor effective or ineffective	Mostly ineffective	Not at all effective
Communication Services	☐	☐	☐	☐	☐
Administrative Services	☐	☐	☐	☐	☐

14. To what extent do you agree with the following statements about ICT policy and guidelines at university? (Please tick one box only for each option).

	Strongly agree	Agree	Neither	Disagree	Strongly disagree
The university has well-structured ICT policies and guidelines for staff	☐	☐	☐	☐	☐
I am familiar with the university's ICT policies and guidelines	☐	☐	☐	☐	☐
The university's ICT policies and guidelines are clear and easy to understand	☐	☐	☐	☐	☐
The university's ICT policies and guidelines are relevant and up to date	☐	☐	☐	☐	☐

Section 3: Information about Your Computer Skills

15. Please rate your skill level in each of the following types of software: (Please tick one box only for each option).

	Expert	Competent	Moderate	Beginner	Non User
Windows or other operating systems	☐	☐	☐	☐	☐
File handling (creating/opening files, etc.)	☐	☐	☐	☐	☐
Email	☐	☐	☐	☐	☐
Instant messaging	☐	☐	☐	☐	☐
Web surfing	☐	☐	☐	☐	☐
Spreadsheets (Excel, etc.)	☐	☐	☐	☐	☐
Word processing (Word, etc.)	☐	☐	☐	☐	☐
Presentation software (PowerPoint, etc.)	☐	☐	☐	☐	☐
Web search engines (Google, etc.)	☐	☐	☐	☐	☐
Graphics (Photoshop, Flash, etc.)	☐	☐	☐	☐	☐
Creating web pages (Dreamweaver, FrontPage, etc.)	☐	☐	☐	☐	☐
Online library resources	☐	☐	☐	☐	☐

16. How did you get this level of skill? (Please tick one box only for each option).

	Very Significant	Significant	Somewhat Significant	Not Significant	N/A
Previous study	☐	☐	☐	☐	☐
Workshops provide by university	☐	☐	☐	☐	☐
Commercial training courses	☐	☐	☐	☐	☐
Self-directed learning	☐	☐	☐	☐	☐
More practice	☐	☐	☐	☐	☐
Friends or colleagues	☐	☐	☐	☐	☐
Other (please specify) ……	☐	☐	☐	☐	☐

17. How would you rate your overall computer skill level using university systems? (Please tick one box only).

Expert	Competent	Moderate	Beginner	Non Use
☐	☐	☐	☐	☐

18. Please indicate the availability of the following kinds of ICT training workshops in your university: (Please tick one box only for each option).

	Readily available to all staff who require it	Available but places are not always available	Available but places are very restricted	Not available
Use of productivity applications such as Microsoft Word, Excel, and PowerPoint	☐	☐	☐	☐
Use of Internet technologies such as email, messaging, and web browsing	☐	☐	☐	☐
Use of on-line administrative services such as enrolment, payment, and human resources	☐	☐	☐	☐

19. If you university provides ICT training workshops for staff, please indicate the extent to which you agree with the following statements. (Please tick one box only for each option).

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
My campus provides appropriate ICT training for my work.	☐	☐	☐	☐	☐
I am encouraged to attend relevant ICT training workshops.	☐	☐	☐	☐	☐
I can usually get a place at an ICT training workshop when I need to.	☐	☐	☐	☐	☐
ICT training workshops are usually well presented.	☐	☐	☐	☐	☐
I usually find the content of ICT training workshops valuable.	☐	☐	☐	☐	☐

Section 4: Information about Your Opinion

20. Which one of the following statements best describes your attitude to adopting new technologies? (Please tick one box only).

☐ I am sceptical of new technologies and use them only when I have to
☐ I am usually one of the last people I know to use new technologies
☐ I usually use new technologies when most people I know do
☐ I like new technologies and use them before most people I know
☐ I love new technologies and am among the first to experiment with and use them

21. How have you benefited from used ICT in your work. (Please tick one box only for each option).

	Strongly agree	Agree	Neither	Disagree	Strongly disagree
ICT makes tasks more enjoyable and engaging	☐	☐	☐	☐	☐
ICT improves the quality of completed work	☐	☐	☐	☐	☐
ICT saves time in completing tasks	☐	☐	☐	☐	☐
ICT provides access to more information and resources	☐	☐	☐	☐	☐
ICT helps manage time and keep track of activities	☐	☐	☐	☐	☐

22. Please suggest other ways in which you think use of ICT can benefit your work.

……
……
……

23. Rate the following statements on how effective they would be for changing your opinion on the use of ICT in their work practices. (Please tick one box only for each option).

	Very effective	Effective	Neither	Ineffective	Strongly ineffective
Not enough time to learn necessary new ICT skills	☐	☐	☐	☐	☐
No need to change; existing work methods work well enough	☐	☐	☐	☐	☐
Lack of encouragement from work supervisors	☐	☐	☐	☐	☐
Inadequate ICT support	☐	☐	☐	☐	☐
Limited or no access to appropriate computer or Internet	☐	☐	☐	☐	☐
Limited or no access to appropriate software	☐	☐	☐	☐	☐
Don't know how to use the software	☐	☐	☐	☐	☐

Don't understand (or don't believe) the potential benefits of ICT	□	□	□	□	□

24. Please suggest other factors that you think prevent effective use of ICT in work practices.

……
……
……

25. Rate the following statements on how effective they would be for increasing your use of ICT at home. (Please tick one box only for each option).

	Very effective	Effective	Neither	Ineffective	Strongly ineffective
More reliable Internet connections	□	□	□	□	□
Cheaper Internet connections	□	□	□	□	□
Wider availability of wireless Internet connection	□	□	□	□	□
Information for parents and authority figure about positive aspects of ICT	□	□	□	□	□
Better support from computer and Internet providers	□	□	□	□	□
More information about setting up and maintaining home ICT	□	□	□	□	□
Active promotion of the benefits of using IT facilities in university working	□	□	□	□	□
Government legislation to protect users from cybercrimes	□	□	□	□	□

26. Please suggest other changes that you think would increase your use of ICT at home.

……
……
……

27. Rate the following statements on how effective they would be for increasing your use of ICT at university. (Please tick one box only for each option).

	Very effective	Effective	Neither	Ineffective	Strongly ineffective
Provide PCs or laptops for employees	□	□	□	□	□
Wider availability of wireless connection	□	□	□	□	□
Readily available training about the use of ICT systems	□	□	□	□	□
Early introduction of ICT training into induction	□	□	□	□	□
Better support from university ICT staff	□	□	□	□	□
Stronger encouragement from university leaders to use ICT tools	□	□	□	□	□
Change university strategies to spend more funds on IT fields in university	□	□	□	□	□
Active promotion of the benefits of using IT facilities in university work	□	□	□	□	□
Provide ICT support in each department	□	□	□	□	□

28. Please suggest other changes that you think would increase your use of ICT at university?

……
……
……

29. If you have any other comments or insights about your experience with ICT at home or university, please feel free to share them with us below.

……
……
……

Section 5: Personal Information

30. What is your gender?

□ Male □ Female

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31. What is your age? (Please tick one box only).

□ 18 – 24 years □ 25 – 29 years
□ 30 – 34 years □ 35 – 39 years
□ 40 – 44 years □ 45 years and over

---

32. Approximately how long have you been working at the university? (Please tick one box only).

□ 1-5 years □ 6-10 years
□ 10-20 years □ More than 20 years

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33. What is your educational qualification? (Please tick one box only).

□ Less than High School □ Diploma
□ Bachelor □ Master
□ PhD

****END SURVEY THANK YOU****

APPENDIX E: STUDENT QUESTIONNAIRE (ARABIC)

القسم الاول: معلومات عن أجهزة الحاسب و اتصال الانترنت الخاصة بك

1. هل تملك جهاز حاسوب خاص بك؟ (الرجاء اختيار إجابة واحدة لكل فقرة) .

• ليس لدي جهاز كمبيوتر	☐ نعم	☐ لا
• كمبيوتر مكتبي	☐ نعم	☐ لا
• كمبيوتر محمول	☐ نعم	☐ لا
• هاتف ذكي (اي فون, سامسونج جالكسي, غيرها)	☐ نعم	☐ لا
• كمبيوتر لوحي (أي باد, سامسونج جاكسي تاب, غيرها)	☐ نعم	☐ لا

2. كم عمر الجهاز الخاص بك الذي تستخدمه عادة؟(الرجاء اختيار إجابة واحدة).

☐ أقل من سنة	☐ سنة
☐ سنتين	☐ ثلاث سنوات
☐ أكثر من ثلاث سنوات (الرجاء تحديد الفترة).....	

3. كم عمر أحدث جهاز كمبيوتر خاص بك؟(الرجاء اختيار إجابة واحدة).

☐ أقل من سنة	☐ سنة
☐ سنتين	☐ ثلاث سنوات
☐ أكثر من ثلاث سنوات (الرجاء تحديد الفترة).....	

4. هل تملك اتصال إنترنت في مكان السكن؟

☐ نعم	☐ لا (اذهب للسؤال 6)

5. الرجاء اختيار نوع اتصال الانترنت المستخدم في المنزل؟ (الرجاء اختيار إجابة واحدة لكل فقرة) .

• اتصال عالي السرعة DSL	☐ نعم	☐ لا
• الطلب الهاتفي Dial-up	☐ نعم	☐ لا
• البث اللاسلكي Wi-Fi	☐ نعم	☐ لا
• شبكة الهاتف الجوال (3G)	☐ نعم	☐ لا
• غير ذلك (الرجاء التحديد).....	☐ نعم	☐ لا

6. هل تملك بريد الكتروني؟

☐ نعم	☐ لا

7. إذا كنت تستخدم الكمبيوتر أو الانترنت الرجاء تحديد نوعية و مدى الإستخدام: (الرجاء اختيار إجابة واحدة لكل فقرة).

	عدة مرات في اليوم	تقريبا مرة واحدة يوميا	تقريبا مرة واحدة أسبوعيا	تقريبا مرة واحدة شهريا	أقل من مرة شهريا	لا أستخدم
• البريد الالكتروني	☐	☐	☐	☐	☐	☐
• للدراسة (الواجبات, المهام, المشاريع, غيرها)	☐	☐	☐	☐	☐	☐
• للتسلية (العاب, افلام, وغيرها)	☐	☐	☐	☐	☐	☐
• أعمال تجارية وتسوق و الدفع	☐	☐	☐	☐	☐	☐
• القراءة (الكتب الإلكترونيه, والصحف الإلكترونية, غيرها)	☐	☐	☐	☐	☐	☐
• التواصل الاجتماعي (تويتر, الفيس بوك, غيرها)	☐	☐	☐	☐	☐	☐
• غيرها.....	☐	☐	☐	☐	☐	☐

8. الى اي مدى تأثير العناصر التالية على استخدامك الحالي والمستقبلي للكمبيوتر و الانترنت: (الرجاء اختيار إجابة واحدة لكل فقرة).

	هام جدا	هام	هام نوعا ما	ليست هام	غير قابل للتطبيق
• الأمور المتعلقة بالخصوصية والأمان	☐	☐	☐	☐	☐
• أجد نفسي منشغلا عن إستخدامها	☐	☐	☐	☐	☐
• لا أملك جهاز حاسب خاص يمكنني إستخدامه بسهولة	☐	☐	☐	☐	☐
• أسعار الانترنت مكلفة جدا	☐	☐	☐	☐	☐
• الإتصال بالانترنت غير متاح في المنطقة	☐	☐	☐	☐	☐

- لست منجذب للتقنية واستخدامها ☐ ☐ ☐ ☐ ☐
- لا أجد الدعم التقني الكافي الذي احتاجه للتعلم والاستخدام ☐ ☐ ☐ ☐ ☐
- أسباب عائلية وثقافية ☐ ☐ ☐ ☐ ☐
- لا أملك المهارة اللازمة للتعامل مع التقنيه ☐ ☐ ☐ ☐ ☐
- غلاء أسعار أجهزة الحاسب ☐ ☐ ☐ ☐ ☐
- أخرى ..... ☐ ☐ ☐ ☐ ☐

القسم الثاني : معلومات عن أجهزة الحاسب و اتصل الانترنت في جامعتك

9. هل تملك صلاحية لإستخدام أجهزة الحاسب الخاصة في الجامعة؟ (الرجاء اختيار إجابة واحدة لكل فقرة).

- أملك صلاحية لإستخدام الحاسب الألي في معامل الحاسب في الجامعة ☐ نعم ☐ لا
- أملك صلاحية لإستخدام الحاسب الألي في مكتبة الجامعة ☐ نعم ☐ لا
- غير ذلك (الرجاء التحديد)..... ☐ نعم ☐ لا

10. كيف يمكنك إستخدام الانترنت في الجامعة؟ (الرجاء اختيار إجابة واحدة لكل فقرة).

- لا أملك صلاحية الدخول الى شبكة الانترنت في الجامعة ☐ نعم ☐ لا
- جهاز حاسب في معامل الحاسب او المكتبه ☐ نعم ☐ لا
- جهاز حاسب محمول متصل بخط ADSL ☐ نعم ☐ لا
- جهاز حاسب محمول متصل بخط Dial-up ☐ نعم ☐ لا
- جهاز حاسب محمول أو هاتف ذكي متصل بالانترنت من خلال الشبكة اللاسلكية في الجامعة ☐ نعم ☐ لا
- غير ذلك (الرجاء التحديد)..... ☐ نعم ☐ لا

11. قيم الانترنت في الجامعة من خلال مايلي: (الرجاء اختيار إجابة واحدة لكل فقرة).

	ممتازة	جيدة جدا	جيدة	مقبول	ضعيف
• الدقة والاستمرارية	☐	☐	☐	☐	☐
• السرعة	☐	☐	☐	☐	☐

12. للخدمات التقنية التالية, الرجاء تحديد مدى إستخدامك للخدمة: (الرجاء اختيار إجابة واحدة لكل فقرة).

خدمات الجامعة الكترونية	دائما	أحيانا	نادر	نادر جدا	لا أستخدم	غير متاح
الخدمات الإلكترونية التعليمية						
• الوصول الى محتوى المواد على موقع الجامعة	☐	☐	☐	☐	☐	☐
• تسجيل المحاضرات	☐	☐	☐	☐	☐	☐
• تسليم الواجبات والمهام إلكترونيا	☐	☐	☐	☐	☐	☐
• عمل الاختبارات إلكترونيا	☐	☐	☐	☐	☐	☐
• نظام كامل لإداره التعلم	☐	☐	☐	☐	☐	☐
• غير ذلك (الرجاء التحديد).....	☐	☐	☐	☐	☐	☐
خدمات الإتصال الإلكترونية						
• نظام البريد الالكتروني للجامعة	☐	☐	☐	☐	☐	☐
• المنتدى و المناقشة الإلكتروني عن طريق (Blackboard)	☐	☐	☐	☐	☐	☐
• نظام رسائل SMS	☐	☐	☐	☐	☐	☐
• التواصل الاجتماعي (تويتر, فيسبوك, وغيرها)	☐	☐	☐	☐	☐	☐
• غير ذلك (الرجاء التحديد).....	☐	☐	☐	☐	☐	☐
الخدمات الإدارية الإلكترونية						
• موقع الجامعة الإلكتروني	☐	☐	☐	☐	☐	☐
• تسجيل المواد إلكترونيا	☐	☐	☐	☐	☐	☐
• الحصول على الدرجات إلكترونيا	☐	☐	☐	☐	☐	☐
• دفع الخدمات إلكترونيا (الطباعة, المواقف, وغيرها)	☐	☐	☐	☐	☐	☐
• بطاقة الطالب الذكية	☐	☐	☐	☐	☐	☐
• نظام دخول المباني إلكتروني	☐	☐	☐	☐	☐	☐
• غير ذلك (الرجاء التحديد).....	☐	☐	☐	☐	☐	☐

13. بالنسبة للخدمات المتاحة في الجامعة, الرجاء تحديد مدى تاثير الخدمات التاليه: (الرجاء اختيار إجابة واحدة لكل فقرة).

	فعالة بشكل كامل	فعالة عموما	محايد	غير فعالة عموما	غير فعالة بشكل كامل
• الخدمات الإلكترونية التعليمية	☐	☐	☐	☐	☐
• خدمات الإتصال الإلكترونية	☐	☐	☐	☐	☐
• الخدمات الإدارية الإلكترونية	☐	☐	☐	☐	☐

القسم الثالث: معلومات عن مهاراتك في الكمبيوتر

14. الرجاء إختيار مستوى مهارتك في كل من البرمجيات التالية: (الرجاء اختيار إجابة واحدة لكل فقرة).

	محترف	مؤهل	معتدل	مبتدئ	لا أستخدمه
• نظام تشغيل ويندوز والأنظمة الأخرى	☐	☐	☐	☐	☐
• التعامل مع الملفات (إنشاء- فتح – غيرها)	☐	☐	☐	☐	☐
• البريد الإلكتروني	☐	☐	☐	☐	☐
• برامج الرسائل الفورية (سكايب- ياهو- غيرها)	☐	☐	☐	☐	☐
• تصفح الانترنت	☐	☐	☐	☐	☐
• الجداول الإلكترونية (الإكسل وغيرها)	☐	☐	☐	☐	☐
• معالجات النصوص (الورد وغيرها)	☐	☐	☐	☐	☐
• العروض والشرائح الإلكترونية (البوربوينت وغيرها)	☐	☐	☐	☐	☐
• محركات البحث على شبكة الانترنت (قوقل وغيرها)	☐	☐	☐	☐	☐
• برامج الرسوميات (فوتوشوب والفلاش وغيرها)	☐	☐	☐	☐	☐
• إنشاء صفحات انترنت بإستخدام فرونت بيج, دريم ويفر وغيرها	☐	☐	☐	☐	☐
• لتعامل مع محتويات المكتبات الإلكترونية على الانترنت	☐	☐	☐	☐	☐

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15. كيف حصلت على هذا المستوى من المهارات؟ (الرجاء اختيار إجابة واحدة لكل فقرة).

	مهم جدا	مهم	مهم نسبيا	غير مهم	غير قابل للتطبيق
• مناهج المرحلة الثانوية	☐	☐	☐	☐	☐
• مناهج المرحلة الجامعية	☐	☐	☐	☐	☐
• ورش العمل في الجامعة	☐	☐	☐	☐	☐
• البرامج التدريبية	☐	☐	☐	☐	☐
• التعلم الذاتي	☐	☐	☐	☐	☐
• من خلال الممارسة	☐	☐	☐	☐	☐
• من خلال الأصدقاء وزملاء العمل	☐	☐	☐	☐	☐
• غير ذلك (الرجاء التحديد).....	☐	☐	☐	☐	☐

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16. ماهو تقييمك الشامل لمستوى مهاراتك في إستخدام أنظمة الجامعة الحاسوبية؟ (الرجاء اختيار إجابة واحدة).

محترف	مؤهل	متوسط	مبتدئ	لا أستخدمه
☐	☐	☐	☐	☐

القسم الرابع: معلومات عن وجهة نظرك

17. أي مما يلي يصف موقفك بشكل صحيح تجاه التقنيات الجديدة؟ (الرجاء اختيار إجابة واحدة).

☐ لا أثق بالتقنيات الجديدة ولا أستخدمها إلا إذا اضطررت إليها
☐ عادة ما أكون من أواخر الناس الذين يتعلمون على التقنيات الجديدة
☐ عادة ما أستخدم التقنيات الجديدة بعدما يستخدمها أغلب الناس الذين أعرفهم
☐ أفضل التقنيات الجديدة وأستخدمها قبل أكثر الناس المقربين
☐ أفضل التقنيات الجديدة و أكون من أوائل من يجربونها ويستخدمونها

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18. أي مما يلي يصف موقفك بشكل صحيح تجاه استخدام تقنيات المعلومات في الفصول الدراسية؟ (الرجاء اختيار إجابة واحدة).

☐ أفضل دراسة المواد التي لا تستخدم تقنيات المعلومات
☐ أفضل دراسة المواد التي تستخدم التقنيات بشكل محدود (البريد الالكتروني و الإستخدام المحدود لعروض البوربوينت في الفصل)
☐ أفضل دراسة المواد التي تستخدم التقنيات بشكل متوسط (البريد الالكتروني, عروض البوربوينت و بعض الأنشطة والمحتويات عن طريق الانترنت)
☐ أفضل دراسة المواد التي تستخدم التقنيات بشكل مكثف (وضح محتوى المحاضرات, العروض التقديمية، البريد الالكتروني, الصوت والفيديو وغيرها)
☐ أفضل دراسة المواد التي تكون بشكل كامل على الانترنت ولا تتطلب التواصل وجها لوجه

19. الرجاء تقييم فعاليه الفوائد التالية لتقنية المعلومات و الاتصالات التي تفيد من وجهة نظرك في **التدريس**. (الرجاء اختيار إجابة واحدة لكل فقرة).

	أوافق بشدة	أوافق	محايد	لا أوافق	لا أوافق بشدة
• تساعد على زيادة الارتباط و التفاعل مع الأنشطة الفصلية	□	□	□	□	□
• زيادة التعليم و المعرفة في مجال الدراسة (التخصص)	□	□	□	□	□
• حفظ الوقت أثناء إكمال الواجبات والاعمال الجامعية	□	□	□	□	□
	أوافق بشدة	أوافق	محايد	لا أوافق	لا أوافق بشدة
• تسهل الوصول الى مصادر معلومات أكثر	□	□	□	□	□
• تساعد في إدارة أنشطة التعلم	□	□	□	□	□
• تطور مهارات التعامل مع التقنية لسوق العمل	□	□	□	□	□

20. الرجاء كتابة فوائد أخرى لإستخدام التقنية في التعليم و التعلم من وجهة نظرك؟

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21. الرجاء تقييم المقترحات التالية لزيادة إستخدامك لتقنية الإتصالات و المعلومات في **المنزل**. (الرجاء اختيار إجابة واحدة لكل فقرة).

	مؤثر جدا	مؤثر	محايد	غير مؤثر	غير مؤثر جدا
• أن يكون إتصال الانترنت أكثر جوده	□	□	□	□	□
• أن يكون إتصال الانترنت أقل سعرا	□	□	□	□	□
• أن يكون إتصال الانترنت اللاسلكي أكثر اتاحه	□	□	□	□	□
• تثقيف أكثر للأباء و الأشخاص ذوي السلطة عن الجوانب الايجابية للتقنية	□	□	□	□	□
• دعم أفضل من مقدمي أجهزة الحاسب و إتصال الانترنت	□	□	□	□	□
• مزيد من المعلومات حول إنشاء وصيانة تكنولوجيا المعلومات والإتصالات في المنزل	□	□	□	□	□
• الترويج لفوائد استخدام تكنولوجيا المعلومات الدراسة الجامعية	□	□	□	□	□
• التشريعات الحكومية لحماية المستخدمين من جرائم الانترنت	□	□	□	□	□

22. الرجاء كتابة تغييرات أخرى إذا كان لديك لزيادة إستخدام التقنية في **المنزل** من وجهة نظرك.

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23. الرجاء تقييم التغييرات المقترحة لزيادة إستخدام الطلاب لتقنية الاتصالات و المعلومات في **الجامعة**. (الرجاء اختيار إجابة واحدة لكل فقرة).

	مؤثر جدا	مؤثر	محايد	غير مؤثر	غير مؤثر جدا
• زيادة في أجهزة الكمبيوتر و معامل كمبيوتر للطلاب	□	□	□	□	□
• زيادة ساعات العمل اليومية و في عطل نهاية الإسبوع لمعامل الكمبيوتر	□	□	□	□	□
• أن يكون إتصال الانترنت اللأسلكي اكثر اتاحه	□	□	□	□	□
• أن يكون التدريب متاح بسهولة حول إستخدام أنظمة تكنولوجيا المعلومات والإتصالات	□	□	□	□	□
• تقديم التدريب المبكر لإستخدام تكنولوجيا المعلومات والإتصالات في برامج المواد	□	□	□	□	□
• دعم تقني جيد من موظفين تكنولوجيا المعلومات والإتصالات	□	□	□	□	□
• التحفيز القوي من المعلمين لإستخدام أدوات تقنية المعلومات والإتصالات	□	□	□	□	□
• الترويج لفوائد إستخدام تكنولوجيا المعلومات في الدراسة الجامعية	□	□	□	□	□

24. الرجاء كتابة تغييرات أخرى اذا كان لديك لزيادة استخدام التقنية في **الجامعة** من وجهة نظرك.

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25. اذا كان لديك أي تعليقات أو وجهة نظر كم خلال خبراتك مع التقنية في **المنزل او الجامعة**, الرجاء المشاركة في طرحها.

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القسم الخامس: المعلومات الشخصية

26. اكتب اسم المدينة التي تسكن فيها عائلتك:

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27. في اي سنه جامعية: (الرجاء اختيار إجابة واحدة).

☐ السنة الاولى
☐ السنة الثانية
☐ السنة الثالثة
☐ السنه الرابعه
☐ سنة التخرج

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28. نوع السكن التي تقيم فية: (الرجاء اختيار إجابة واحدة).

☐ داخل الجامعة
☐ في شقة وحيدا
☐ سكن مشترك مع عدة اشخاص
☐ مع العائلة
☐ غير ذلك (الرجاء التحديد).....

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29. الجنس:

☐ ذكر
☐ أنثى

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30. العمر: (الرجاء اختيار إجابة واحدة).

☐ 18 – 24 سنة
☐ 25 – 29 سنة
☐ 30 – 34 سنة
☐ 35 – 39 سنة
☐ 40 – 44 سنة
☐ 45 سنة او اكثر

*** انتهت الإستبانة وشكرا لك ***

APPENDIX F: FACULTY MEMBER QUESTIONNAIRE (ARABIC)

القسم الاول: معلومات عن أجهزة الحاسب و اتصال الانترنت الخاصة بك

1. هل تملك جهاز حاسوب خاص بك؟ (الرجاء اختيار إجابة واحدة لكل فقرة).

• ليس لدي جهاز كمبيوتر	☐ نعم	☐ لا
• كمبيوتر مكتبي	☐ نعم	☐ لا
• كمبيوتر محمول	☐ نعم	☐ لا
• هاتف ذكي (اي فون, سامسونج جالكسي, غيرها)	☐ نعم	☐ لا
• كمبيوتر لوحي (أي باد, سامسونج جاكسي تاب, غيرها)	☐ نعم	☐ لا

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2. كم عمر الجهاز الخاص بك الذي تستخدمه عادة؟ (الرجاء اختيار إجابة واحدة).

☐ أقل من سنة	☐ سنة
☐ سنتين	☐ ثلاث سنوات
☐ أكثر من ثلاث سنوات (الرجاء تحديد الفترة).....	

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3. كم عمر أحدث جهاز كمبيوتر خاص بك؟ (الرجاء اختيار إجابة واحدة).

☐ أقل من سنة	☐ سنة
☐ سنتين	☐ ثلاث سنوات
☐ أكثر من ثلاث سنوات (الرجاء تحديد الفترة).....	

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4. هل تملك اتصال إنترنت في مكان السكن؟

☐ نعم	☐ لا (اذهب للسؤال 6)

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5. الرجاء اختيار نوع اتصال الانترنت المستخدم في المنزل؟ (الرجاء إجابة واحدة واحده لكل فقرة).

• اتصال عالي السرعة DSL	☐ نعم	☐ لا
• الطلب الهاتفي Dial-up	☐ نعم	☐ لا
• البث اللاسلكي Wi-Fi	☐ نعم	☐ لا
• شبكة الهاتف الجوال (3G)	☐ نعم	☐ لا
• غير ذلك (الرجاء التحديد).....	☐ نعم	☐ لا

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6. هل تملك بريد الكتروني؟

☐ نعم	☐ لا

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7. إذا كنت تستخدم الكمبيوتر أو الانترنت الرجاء تحديد نوعية و مدى الإستخدام: (الرجاء اختيار إجابة واحدة لكل خيار).

	عدة مرات في اليوم	تقريبا مرة واحدة يوميا	تقريبا مرة واحدة أسبوعيا	تقريبا مرة واحدة شهريا	أقل من مرة شهريا	لا أستخدم
• البريد الالكتروني	☐	☐	☐	☐	☐	☐
• للتدريس (الواجبات, المهام, المشاريع, غيرها)	☐	☐	☐	☐	☐	☐
• للتسلية (العاب, افلام, وغيرها)	☐	☐	☐	☐	☐	☐
• أعمال تجارية وتسوق و الدفع	☐	☐	☐	☐	☐	☐
• القراءة (الكتب الإلكترونية, والصحف الالكترونية, غيرها)	☐	☐	☐	☐	☐	☐
• التواصل الاجتماعي (تويتر, الفيس بوك, غيرها)	☐	☐	☐	☐	☐	☐
• غيرها.....	☐	☐	☐	☐	☐	☐

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8. الى أي مدى تأثير العناصر التالية على استخدامك الحالي والمستقبلي للكمبيوتر والانترنت: (الرجاء اختيار إجابة واحدة لكل خيار).

	هام جدا	هام	هام نوعا ما	ليست هام	غير قابل للتطبيق
• الأمور المتعلقة بالخصوصية والأمان	☐	☐	☐	☐	☐
• أجد نفسي منشغلا عن إستخدامها	☐	☐	☐	☐	☐
• لا أملك جهاز حاسب خاص يمكنني إستخدامه بسهولة	☐	☐	☐	☐	☐

- أسعار الانترنت مكلفة جدا ☐ ☐ ☐ ☐ ☐
- الإتصال بالانترنت غير متاح في المنطقة ☐ ☐ ☐ ☐ ☐
- لست منجذب للتقنية واستخدامها ☐ ☐ ☐ ☐ ☐
- لا أجد الدعم التقني الكافي الذي احتاجه للتعلم والاستخدام ☐ ☐ ☐ ☐ ☐
- أسباب عائلية وثقافية ☐ ☐ ☐ ☐ ☐
- لا أملك المهارة اللازمة للتعامل مع التقنيه ☐ ☐ ☐ ☐ ☐
- غلاء اسعار أجهزة الحاسب ☐ ☐ ☐ ☐ ☐
- أخرى ..... ☐ ☐ ☐ ☐ ☐

القسم الثاني: معلومات عن أجهزة الحاسب و اتصال الانترنت في جامعتك

9. هل تملك صلاحية العمل على أجهزة الحاسب في الجامعة؟

☐ نعم ☐ لا

10. الرجاء اختيار نوع اتصال الانترنت المستخدم في الجامعة؟ (الرجاء اختيار إجابة واحدة لكل فقرة).

- لا أملك صلاحية الدخول الى شبكة الانترنت في الجامعة ☐ نعم ☐ لا
- جهاز حاسب مكتبي في المكتب ☐ نعم ☐ لا
- جهاز حاسب في معامل الحاسب ☐ نعم ☐ لا
- جهاز حاسب محمول متصل بخط ADSL ☐ نعم ☐ لا
- جهاز حاسب محمول متصل بخط Dial-up ☐ نعم ☐ لا
- جهاز حاسب محمول أو هاتف ذكي متصل بالانترنت من خلال الشبكة اللاسلكية في الجامعة ☐ نعم ☐ لا
- غير ذلك (الرجاء التحديد)..... ☐ نعم ☐ لا

11. قيم الانترنت في الجامعة من خلال مايلي:(الرجاء اختيار إجابة واحدة لكل خيار) .

	ممتازة	جيدة جدا	جيدة	مقبول	ضعيف
• الدقة والاستمرارية	☐	☐	☐	☐	☐
• السرعة	☐	☐	☐	☐	☐

12. للخدمات التقنية التالية, الرجاء تحديد مدى إستخدامك للخدمة: (الرجاء اختيار إجابة واحدة لكل فقرة).

خدمات الجامعة الكترونية	دائما	أحيانا	نادر	نادر جدا	لا أستخدم	غير متاح
الخدمات الإلكترونية التعليمية						
• تقديم محتوى المواد على موقع الجامعة	☐	☐	☐	☐	☐	☐
• تسجيل المحاضرات	☐	☐	☐	☐	☐	☐
• تسليم الواجبات والمهام إلكترونيا	☐	☐	☐	☐	☐	☐
• عمل الاختبارات إلكترونيا	☐	☐	☐	☐	☐	☐
• نظام كامل لإدارة التعلم	☐	☐	☐	☐	☐	☐
• غير ذلك (الرجاء التحديد).....	☐	☐	☐	☐	☐	☐
خدمات الإتصال الإلكترونية						
• نظام البريد الإلكتروني للجامعة	☐	☐	☐	☐	☐	☐
• المنتدى و المناقشة الإلكتروني عن طريق (Blackboard)	☐	☐	☐	☐	☐	☐
• نظام رسائل SMS	☐	☐	☐	☐	☐	☐
• التواصل الاجتماعي (تويتر, فيسبوك, وغيرها)	☐	☐	☐	☐	☐	☐
• غير ذلك (الرجاء التحديد).....	☐	☐	☐	☐	☐	☐
الخدمات الإدارية الإلكترونية						
• موقع الجامعة الالكتروني	☐	☐	☐	☐	☐	☐
• تسجيل المواد إلكترونيا	☐	☐	☐	☐	☐	☐
• نشر الدرجات إلكترونيا	☐	☐	☐	☐	☐	☐
• دفع الخدمات إلكترونيا (الطباعة, المواقف, وغيرها)	☐	☐	☐	☐	☐	☐
• بطاقة عضو هيئة التدريس الذكية	☐	☐	☐	☐	☐	☐
• نظام دخول المباني الكتروني	☐	☐	☐	☐	☐	☐
• نظام الخدمات الإلكتروني الخاص باعضاء هيئة التدريس	☐	☐	☐	☐	☐	☐
• صفحة عضو هيئة التدريس على الموقع	☐	☐	☐	☐	☐	☐
• غير ذلك (الرجاء التحديد).....	☐	☐	☐	☐	☐	☐

13. بالنسبة للخدمات المتاحة في الجامعة, الرجاء تحديد مدى تاثير الخدمات التاليه: (الرجاء اختيار اجابه واحده لكل فقرة).

	فعالة بشكل كامل	فعالة عموما	محايد	غير فعالة عموما	غير فعالة بشكل كامل
• الخدمات الإلكترونية التعليمية	☐	☐	☐	☐	☐
• خدمات الإتصال الإلكترونية	☐	☐	☐	☐	☐
• الخدمات الإدارية الإلكترونية	☐	☐	☐	☐	☐

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14. الى اي مدى تتفق مع العبارات التالية حول قواعد و سياسة إستخدام تقنية الاتصالات و المعلومات و المبادئ التوجيهية للإستخدام في الجامعة: (الرجاء اختيار إجابة واحدة لكل فقرة)

	أوافق بشدة	أوافق	محايد	لا أوافق	لا أوافق بشدة
• الجامعة تملك سياسات إستخدام تقنية الاتصالات والمعلومات و المبادئ التوجيهية لإستخدامها للموظفين	☐	☐	☐	☐	☐
• أنا على دراية بسياسات استخدام تقنية الاتصالات والمعلومات و المبادئ التوجيهية للإستخدامها في الجامعة	☐	☐	☐	☐	☐
• سياسات إستخدام تقنية الاتصالات والمعلومات والمبادئ التوجيهية لإستخدامها في الجامعة واضحة وسهله الفهم	☐	☐	☐	☐	☐
• سياسات إستخدام تقنية الاتصالات والمعلومات والمبادئ التوجيهية لإستخدامها في الجامعة ذات علاقة و محدثة بشكل دوري	☐	☐	☐	☐	☐

القسم الثالث: معلومات عن مهاراتك في الكمبيوتر

15. الرجاء إختيار مستوى مهارتك في كل من البرمجيات التالية: (الرجاء اختيار إجابة واحدة لكل فقرة).

	محترف	مؤهل	معتدل	مبتدئ	لا أستخدمه
• نظام تشغيل ويندوز والأنظمة الأخرى	☐	☐	☐	☐	☐
• التعامل مع الملفات (إنشاء- فتح – غيرها)	☐	☐	☐	☐	☐
• البريد الإلكتروني	☐	☐	☐	☐	☐
• برامج الرسائل الفورية (سكايب- ياهو- غيرها)	☐	☐	☐	☐	☐
• تصفح الانترنت	☐	☐	☐	☐	☐
• الجداول الإلكترونية (الإكسل وغيرها)	☐	☐	☐	☐	☐
• معالجات النصوص (الورد وغيرها)	☐	☐	☐	☐	☐
• العروض والشرائح الإلكترونية (البوربوينت وغيرها)	☐	☐	☐	☐	☐
• محركات البحث على شبكة الانترنت (قوقل وغيرها)	☐	☐	☐	☐	☐
• برامج الرسوميات (فوتوشوب والفلاش وغيرها)	☐	☐	☐	☐	☐
• إنشاء صفحات انترنت بإستخدام فرونت بيج, دريم ويفر وغيرها.	☐	☐	☐	☐	☐
• التعامل مع محتويات المكتبات الإلكترونية على الانترنت.	☐	☐	☐	☐	☐

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16. كيف حصلت على هذا المستوى من المهارات؟ (الرجاء اختيار إجابة واحدة لكل فقرة).

	مهم جدا	مهم	مهم نسبيا	غير مهم	غير قابل للتطبيق
• دراستي في المراحل السابقة	☐	☐	☐	☐	☐
• ورش العمل في الجامعة	☐	☐	☐	☐	☐
• البرامج التدريبية	☐	☐	☐	☐	☐
• التعلم الذاتي	☐	☐	☐	☐	☐
• من خلال الممارسة	☐	☐	☐	☐	☐
• من خلال الأصدقاء وزملاء العمل	☐	☐	☐	☐	☐
• غير ذلك (الرجاء التحديد).....	☐	☐	☐	☐	☐

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17. ماهو تقييمك الشامل لمستوى مهاراتك في إستخدام أنظمة الجامعة الحاسوبية؟ (الرجاء اختيار إجابة واحدة).

محترف	مؤهل	متوسط	مبتدئ	لا أستخدمه
☐	☐	☐	☐	☐

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18. أي نوع من الدورات التدريبة و ورش العمل في مجال تقنية الإتصالات و المعلومات متاحة في الجامعة: (الرجاء اختيار إجابة واحدة لكل فقرة).

	متوفرة لجميع الموظفين الذين يحتاجونها	متوفرة ولكن المقاعد ليست دائما متاحة	متوفرة ولكن الأماكن محدودة جدا	غير متوفرة
• تطبيقات مايكروسوفت مثل معالج النصوص (Word) والجداول الالكترونية(Excel) و العروض الالكترونية(PowerPoint)	☐	☐	☐	☐

- إستخدام تقنيات الانترنت مثل البريد الالكتروني و المتصفح ☐ ☐ ☐ ☐
- إســتخدام التقنيات المســتخدمة في التعليم مثل نظام ادارة التعلم و المهام الالكترونية ☐ ☐ ☐ ☐

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19. اذا كانت الجامعة توفر التدريب و ورش العمل في مجال تقنية الإتصالات والمعلومات للموظفين. الرجاء الإشارة إلى أي مدى تتفق مع العبارات التالية: (الرجاء اختيار إجابة واحدة لكل فقرة).

	أوافق بشدة	أوافق	محايد	لا أوافق	لا أوافق بشدة
• الجامعة توفر التدريب المناسب لتقنية الإتصالات والمعلومات المتعلقة بعملي	☐	☐	☐	☐	☐
• الجامعة تشـــجعني لحضـــور الدورات و ورش العمل في تقنية الاتصـــالات والمعلومات ذات الصلة بعملي	☐	☐	☐	☐	☐
• في العادة أتمكن من الحصـول على مقعد للحضـور للتدريب و ورش العمل عندما أحتاج في تقنية الإتصالات والمعلومات	☐	☐	☐	☐	☐
• التدريب و ورش العمل في تقنية الإتصالات والمعلومات عادة تعرض بشكل جيد	☐	☐	☐	☐	☐
• في العادة أجد محتويات التدريب و ورش العمل في تقنية الإتصالات والمعلومات ذات قيمة جيدة	☐	☐	☐	☐	☐

القسم الرابع: معلومات عن وجهة نظرك

20. أي مما يلي يصف موقفك بشكل صحيح تجاه التقنيات الجديدة؟ (الرجاء اختيار إجابة واحدة).

☐ لا أثق بالتقنيات الجديدة ولا أستخدمها إلا إذا اضطررت إليها
☐ عادة ما أكون من أواخر الناس الذين يتعلمون على التقنيات الجديدة
☐ عادة ما أستخدم التقنيات الجديدة بعدما يستخدمها أغلب الناس الذين أعرفهم
☐ أفضل التقنيات الجديدة وأستخدمها قبل أكثر الناس المقربين
☐ أفضل التقنيات الجديدة و أكون من أوائل من يجربونها ويستخدمونها

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21. أي مما يلي يصف موقفك بشكل صحيح تجاه استخدام تقنيات المعلومات في الفصول الدراسية؟ (الرجاء اختيار إجابة واحدة).

☐ أفضل تدريس المواد التي لا تستخدم تقنيات المعلومات
☐ أفضل تدريس المواد التي تستخدم التقنيات بشكل محدود (البريد الالكتروني و الإستخدام المحدود لعروض البوربوينت في الفصل)
☐ أفضل تدريس المواد التي تستخدم التقنيات بشكل متوسط (البريد الالكتروني, عروض البوربوينت و بعض الأنشطة والمحتويات عن طريق الانترنت)
☐ أفضل تدريس المواد التي تستخدم التقنيات بشكل مكثف (وضح محتوى المحاضرات, العروض التقديمية، البريد الالكتروني, الصوت والفيديو وغيرها)
☐ أفضل تدريس المواد التي تحرر بشكل كامل على الانترنت ولا تتطلب التواصل وجها لوجه

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22. الرجاء تقييم فعاليه الفوائد التالية لتقنية المعلومات و الاتصالات التي تفيد من وجهة نظرك في التدريس. (الرجاء اختيار اجابه واحده لكل فقرة).

	أوافق بشدة	أوافق	محايد	لا أوافق	لا أوافق بشدة
• تساعد الطلاب على زيادة الارتباط و التفاعل مع الأنشطة الفصلية	☐	☐	☐	☐	☐
• تطوير قدرة المعلم على التدريس وإيصال المعلومة و المعرفة في مجال التدريس في نفس التخصص	☐	☐	☐	☐	☐
• حفظ وقت المعلم في إعداد المحاضرات و المواد الدراسية الأخرى	☐	☐	☐	☐	☐
• حفظ وقت المعلم أثناء إعداد الدرجات و التقييم	☐	☐	☐	☐	☐
• توفر وصول أسهل و أكثر اتساعا وشمولية و أحدث المعلومات و المصادر	☐	☐	☐	☐	☐
• تساعد المعلم في إدارة المعلومات الفصلية و أنشطة التدريس	☐	☐	☐	☐	☐
• تمكن من تسهيل المشاركة لمحتويات المواد بين الزملاء الأكاديميين	☐	☐	☐	☐	☐
• لست أفهم أو لست مقتنعا بفوائد إستخدام تقنية المعلومات والإتصالات	☐	☐	☐	☐	☐

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23. الرجاء كتابة فوائد أخرى لإستخدام تقنية الاتصالات و المعلومات في التدريس من وجهة نظرك؟

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24. الرجاء تقييم المقترحات التالية التي تؤثر على وجهة نظرك في استخدام تقنية الاتصالات و المعلومات في **التدريس**. (الرجاء إجابة واحدة واحده لكل فقرة).

	مؤثر جدا	مؤثر	محايد	غير مؤثر	غير مؤثر جدا
• لا أمتلك وقت كافي لتعلم مهارات تقنية الإتصالات و المعلومات مهمة جديدة	☐	☐	☐	☐	☐

• لا أحتاج للتغيير, أساليب التدريس الموجودة تعمل بشكل جيد بما فية الكفاية	☐	☐	☐	☐	☐
• عدم وجود التشجيع من الكلية أو الجامعة	☐	☐	☐	☐	☐
• الدعم لتقنية الإتصالات و المعلومات غير ملائم	☐	☐	☐	☐	☐
• إمكانية الوصول معدومة أو محدودة لأجهزة الكمبيوتر و الانترنت المناسبة	☐	☐	☐	☐	☐
• إمكانية الوصول معدومة أو محدودة للبرامج المناسبة	☐	☐	☐	☐	☐
• لا أعرف كيفية استخدام البرامج	☐	☐	☐	☐	☐
• لست أفهم أو لست مقتنعا بفوائد إستخدام تقنية المعلومات والإتصالات	☐	☐	☐	☐	☐

25. الرجاء كتابة عناصر أخرى أثرت على إستخدام تقنية الإتصالات و المعلومات في التدريس بشكل فعال من وجهة نظرك.

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.....
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26. الرجاء تقييم المقترحات التالية لزيادة استخدامك لتقنية الإتصالات و المعلومات في **المنزل**. (الرجاء اختيار إجابة واحدة لكل فقرة).

	مؤثر جدا	مؤثر	محايد	غير مؤثر	غير مؤثر جدا
• أن يكون اتصال الانترنت أكثر جوده	☐	☐	☐	☐	☐
• أن يكون اتصال الانترنت أقل سعرا	☐	☐	☐	☐	☐
• أن يكون اتصال الانترنت اللاسلكي أكثر إتاحة	☐	☐	☐	☐	☐
• تثقيف أكثر للأباء و الأشخاص ذوي السلطة عن الجوانب الإيجابية للتقنية	☐	☐	☐	☐	☐
• دعم أفضل من مقدمي أجهزة الحاسب و اتصال الانترنت	☐	☐	☐	☐	☐
• مزيد من المعلومات حول إنشاء وصيانة تكنولوجيا المعلومات والإتصالات في المنزل	☐	☐	☐	☐	☐
• الترويج لفوائد إستخدام تكنولوجيا المعلومات الدراسة الجامعية	☐	☐	☐	☐	☐
• التشريعات الحكومية لحماية المستخدمين من جرائم الانترنت	☐	☐	☐	☐	☐

27. الرجاء كتابة تغييرات أخرى إذا كان لديك لزيادة استخدام التقنية في **المنزل** من وجهة نظرك.

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28. الرجاء تقييم المقترحات التالية لزيادة استخدامك لتقنية الإتصالات و المعلومات في **الجامعة**. (الرجاء اختيار إجابة واحدة لكل فقرة).

	مؤثر جدا	مؤثر	محايد	غير مؤثر	غير مؤثر جدا
• توفير اجهزة حاسب الي مكتبي و اجهزة محمولة لاعضاء هيئة التدريس	☐	☐	☐	☐	☐
• أن يكون إتصال الانترنت اللاسلكي أكثر اتاحة	☐	☐	☐	☐	☐
• أن يكون التدريب متاح بسهولة حول إستخدام أنظمة تكنولوجيا المعلومات والإتصالات	☐	☐	☐	☐	☐
• تقديم التدريب المبكر لإستخدام تكنولوجيا المعلومات والإتصالات	☐	☐	☐	☐	☐
• دعم تقني جيد من موظفين تكنولوجيا المعلومات والإتصالات	☐	☐	☐	☐	☐
• التحفيز القوي من المدراء في الجامعة و التعليم العالي لإستخدام أدوات تقنية المعلومات والإتصالات	☐	☐	☐	☐	☐
• تطوير و تغيير في الخطط المتسقبلية للجامعة لتفعيل إستخدام التقنية بشكل أكثر فعالية و بشكل أوسع	☐	☐	☐	☐	☐
• الترويج لفوائد إستخدام تكنولوجيا المعلومات في التدريس والعمل الجامعي	☐	☐	☐	☐	☐
• تقديم دعم فني خاص بكل قسم من اقسام الجامعة	☐	☐	☐	☐	☐

29. الرجاء كتابة تغييرات أخرى إذا كان لديك لزيادة استخدام التقنية في **الجامعة** من وجهة نظرك.

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30. الرجاء تقييم التغييرات المقترحة لزيادة استخدام **الطلاب** لتقنية الإتصالات و المعلومات في **الجامعة**. (الرجاء اختيار إجابة واحدة لكل فقرة).

	مؤثر جدا	مؤثر	محايد	غير مؤثر	غير مؤثر جدا
• زيادة في أجهزة الكمبيوتر و معامل كمبيوتر للطلاب	☐	☐	☐	☐	☐
• زيادة ساعات العمل اليومية و في عطل نهاية الإسبوع لمعامل الكمبيوتر	☐	☐	☐	☐	☐
• أن يكون اتصال الانترنت اللاسلكي اكثر اتاحه	☐	☐	☐	☐	☐
• أن يكون التدريب متاح بسهولة حول إستخدام أنظمة تكنولوجيا المعلومات والإتصالات	☐	☐	☐	☐	☐
• تقديم التدريب المبكر لإستخدام تكنولوجيا المعلومات والإتصالات	☐	☐	☐	☐	☐
• دعم تقني جيد من موظفين تكنولوجيا المعلومات والإتصالات	☐	☐	☐	☐	☐
• التحفيز القوي من المعلمين لإستخدام ادوات تقنية المعلومات والإتصالات	☐	☐	☐	☐	☐

- الترويج لفوائد إستخدام تكنولوجيا المعلومات في الدراسة □ □ □ □ □ □

31. الرجاء كتابة تغييرات أخرى إذا كان لديك لزيادة استخدام **الطلاب** لتقنية الإتصالات و المعلومات في **الجامعة** من وجهة نظرك.

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32. إذا كان لديك أي تعليقات أو وجهة نظر من خلال خبراتك مع التقنية في **المنزل أو الجامعة**, الرجاء المشاركة في طرحها.

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القسم الخامس: المعلومات الشخصية

33. اكتب اسم التخصص الذي تدرس فيه:

.....

34. هل تسكن داخل الجامعة أم خارجها؟

□ داخل الجامعة □ خارج الجامعة

35. الجنس:

□ ذكر □ أنثى

36. العمر: (الرجاء اختيار إجابة واحدة).

□ 18 – 24 سنة □ 25 – 29 سنة
□ 30 – 34 سنة □ 35 – 39 سنة
□ 40 – 44 سنة □ 45 سنة او اكثر

37. كم مدة عملك كأستاذ أكاديمي: (الرجاء اختيار إجابة واحدة).

□ 1 - 5 سنوات □ 6 - 10 سنوات
□ 10 – 20 سنة □ أكثر من 20 سنة

38. ماهو مؤهلك العلمي؟ (الرجاء اختيار إجابة واحدة).

□ دبلوم □ بكالوريوس
□ ماجستير □ دكتوراة

*** انتهت الإستبانة وشكرا لك ***

APPENDIX G: ADMINISTRATIVE STAFF QUESTIONNAIRE (ARABIC)

القسم الاول: معلومات عن أجهزة الحاسب و اتصال الانترنت الخاصة بك

1. هل تملك جهاز حاسوب خاص بك ؟ (الرجاء اختيار إجابة واحدة لكل فقرة) .

• ليس لدي جهاز كمبيوتر	☐ نعم	☐ لا
• كمبيوتر مكتبي	☐ نعم	☐ لا
• كمبيوتر محمول	☐ نعم	☐ لا
• هاتف ذكي (اي فون, سامسونج جالكسي, غيرها)	☐ نعم	☐ لا
• كمبيوتر لوحي (أي باد, سامسونج جاكسي تاب, غيرها)	☐ نعم	☐ لا

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2. كم عمر الجهاز الخاص بك الذي تستخدمه عادة؟ (الرجاء اختيار إجابة واحدة).

☐ أقل من سنة	☐ سنة
☐ سنتين	☐ ثلاث سنوات
☐ أكثر من ثلاث سنوات (الرجاء تحديد الفترة).....	

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3. كم عمر احدث جهاز كمبيوتر خاص بك؟ (الرجاء اختيار إجابة واحدة).

☐ أقل من سنة	☐ سنة
☐ سنتين	☐ ثلاث سنوات
☐ أكثر من ثلاث سنوات (الرجاء تحديد الفترة).....	

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4. هل تملك اتصال انترنت في مكان السكن؟

☐ نعم	☐ لا (اذهب للسؤال 6)

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5. الرجاء اختيار نوع اتصال الانترنت المستخدم في المنزل؟ (الرجاء اختيار إجابة واحدة لكل فقرة).

• اتصال عالي السرعة DSL	☐ نعم	☐ لا
• الطلب الهاتفي Dial-up	☐ نعم	☐ لا
• البث اللاسلكي Wi-Fi	☐ نعم	☐ لا
• شبكة الهاتف الجوال (3G)	☐ نعم	☐ لا
• غير ذلك (الرجاء التحديد).....	☐ نعم	☐ لا

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6. هل تملك بريد الكتروني؟

☐ نعم	☐ لا

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7. إذا كنت تستخدم الكمبيوتر أو الانترنت الرجاء تحديد نوعية و مدى الاستخدام: (الرجاء اختيار إجابة واحدة لكل فقرة).

	عدة مرات في اليوم	تقريبا مرة واحدة يوميا	تقريبا مرة واحدة إسبوعيا	تقريبا مرة واحدة شهريا	أقل من مرة شهريا	لا أستخدم
• البريد الالكتروني	☐	☐	☐	☐	☐	☐
• للعمل و اداء المهام في الجامعة	☐	☐	☐	☐	☐	☐
• للتسلية (العاب, افلام, وغيرها)	☐	☐	☐	☐	☐	☐
• أعمال تجارية وتسوق و الدفع	☐	☐	☐	☐	☐	☐
• القراءة (الكتب الإلكترونية, والصحف الإلكترونية, غيرها)	☐	☐	☐	☐	☐	☐
• التواصل الاجتماعي (تويتر, الفيس بوك, غيرها)	☐	☐	☐	☐	☐	☐
• غيرها.....	☐	☐	☐	☐	☐	☐

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8. الى اي مدى تأثير العناصر التالية على استخدامك الحالي والمستقبلي للكمبيوتر والانترنت: (الرجاء اختيار إجابة واحدة لكل فقرة).

	هام جدا	هام	هام نوعا ما	غير هام	غير قابل للتطبيق
• الأمور المتعلقة بالخصوصية والأمان	☐	☐	☐	☐	☐
• أجد نفسي منشغلا عن استخدامها	☐	☐	☐	☐	☐
• لا أملك جهاز حاسب خاص يمكنني إستخدامه بسهولة	☐	☐	☐	☐	☐

- أسعار الانترنت مكلفة جدا ☐ ☐ ☐ ☐ ☐
- الاتصال بالانترنت غير متاح في المنطقة ☐ ☐ ☐ ☐ ☐
- لست منجذب للتقنية واستخدامها ☐ ☐ ☐ ☐ ☐
- لا أجد الدعم التقني الكافي الذي احتاجه للتعلم والاستخدام ☐ ☐ ☐ ☐ ☐
- أسباب عائلية وثقافية ☐ ☐ ☐ ☐ ☐
- لا أملك المهارة اللازمة للتعامل مع التقنيه ☐ ☐ ☐ ☐ ☐
- غلاء أسعار أجهزة الحاسب ☐ ☐ ☐ ☐ ☐
- أخرى ..... ☐ ☐ ☐ ☐ ☐

القسم الثاني: معلومات عن أجهزة الحاسب و اتصال الانترنت في جامعتك

9. هل تملك حاسب الي في مكتبك في الجامعة ؟

☐ نعم ☐ لا

10. الرجاء اختيار نوع اتصال الانترنت المستخدم في الجامعة؟ (الرجاء اختيار إجابة واحدة لكل فقرة).

- لا أملك صلاحية الدخول الى شبكة الانترنت في الجامعة ☐ نعم ☐ لا
- جهاز حاسب مكتبي في المكتب ☐ نعم ☐ لا
- جهاز حاسب في معامل الحاسب ☐ نعم ☐ لا
- جهاز حاسب محمول متصل بخط ADSL ☐ نعم ☐ لا
- جهاز حاسب محمول متصل بخط Dial-up ☐ نعم ☐ لا
- جهاز حاسب محمول أو هاتف ذكي متصل بالانترنت من خلال الشبكة اللاسلكية في الجامعة ☐ نعم ☐ لا
- غير ذلك (الرجاء التحديد)..... ☐ نعم ☐ لا

11. قيم الانترنت في الجامعة من خلال مايلي: (الرجاء اختيار إجابة واحدة لكل فقرة) .

	ممتازة	جيدة جدا	جيدة	مقبول	ضعيف
• الدقة والاستمرارية	☐	☐	☐	☐	☐
• السرعة	☐	☐	☐	☐	☐

12. للخدمات التقنية التالية, الرجاء تحديد مدى استخدامك للخدمة: (الرجاء اختيار اجابه واحده لكل فقرة).

	دائما	أحيانا	نادر	نادر جدا	لا أستخدم	غير متاح
خدمات الإتصال الإلكترونية						
• نظام البريد الالكتروني للجامعة	☐	☐	☐	☐	☐	☐
• المنتدى و المناقشة الالكتروني عن طريق (Blackboard)	☐	☐	☐	☐	☐	☐
• نظام رسائل SMS	☐	☐	☐	☐	☐	☐
• التواصل الاجتماعي (تويتر, فيسبوك, وغيرها)	☐	☐	☐	☐	☐	☐
• غير ذلك (الرجاء التحديد).....	☐	☐	☐	☐	☐	☐
الخدمات الإدارية الإلكترونية						
• موقع الجامعة الالكتروني	☐	☐	☐	☐	☐	☐
• دفع الخدمات الكترونيا (الطباعة, المواقف, وغيرها)	☐	☐	☐	☐	☐	☐
• بطاقة الموظف الذكية	☐	☐	☐	☐	☐	☐
• نظام دخول المباني الكتروني	☐	☐	☐	☐	☐	☐
• نظام الخدمات الالكتروني الخاص بالموظفين	☐	☐	☐	☐	☐	☐
• غير ذلك (الرجاء التحديد).....	☐	☐	☐	☐	☐	☐

13. بالنسبة للخدمات المتاحة في الجامعة, الرجاء تحديد مدى تاثير الخدمات التاليه: (الرجاء اختيار إجابة واحدة لكل فقرة).

	فعالة بشكل كامل	فعالة عموما	محايد	غير فعالة عموما	غير فعالة بشكل كامل
• خدمات الإتصال الإلكترونية	☐	☐	☐	☐	☐
• الخدمات الإدارية الإلكترونية	☐	☐	☐	☐	☐

14. إلى أي مدى تتفق مع العبارات التالية حول قواعد و سياسة استخدام تقنية الإتصالات و المعلومات و المبادئ التوجيهية للإستخدام في الجامعة: (الرجاء اختيار إجابة واحدة لكل فقرة).

	أوافق بشدة	أوافق	محايد	لا أوافق	لا وأفق بشدة
• الجامعة تملك سياسات إستخدام تقنية الاتصالات والمعلومات و المبادئ التوجيهية لإستخدامها للموظفين	☐	☐	☐	☐	☐

• أنا على دراية بسياسات استخدام تقنية الاتصالات والمعلومات و المبادئ التوجيهية للإستخدامها في الجامعة	☐	☐	☐	☐	☐
• سياسات إستخدام تقنية الاتصالات والمعلومات والمبادئ التوجيهية لإستخدامها في الجامعة واضحة وسهله الفهم	☐	☐	☐	☐	☐
• سياسات إستخدام تقنية الاتصالات والمعلومات والمبادئ التوجيهية لإستخدامها في الجامعة ذات علاقة و محدثة بشكل دوري	☐	☐	☐	☐	☐

القسم الثالث: معلومات عن مهاراتك في الكمبيوتر

15. الرجاء إختيار مستوى مهارتك في كل من البرمجيات التالية: (الرجاء اختيار إجابة واحدة لكل فقرة).

	محترف	مؤهل	معتدل	مبتدئ	لا أستخدمه
• نظام تشغيل ويندوز والأنظمة الأخرى	☐	☐	☐	☐	☐
• التعامل مع الملفات (إنشاء- فتح – غيرها)	☐	☐	☐	☐	☐
• البريد الإلكتروني	☐	☐	☐	☐	☐
• برامج الرسائل الفورية (سكايب- ياهو- غيرها)	☐	☐	☐	☐	☐
• تصفح الانترنت	☐	☐	☐	☐	☐
• الجداول الإلكترونية (الإكسل وغيرها)	☐	☐	☐	☐	☐
• معالجات النصوص (الورد وغيرها)	☐	☐	☐	☐	☐
• العروض والشرائح الإلكترونية (البوربوينت وغيرها)	☐	☐	☐	☐	☐
• محركات البحث على شبكة الانترنت (قوقل وغيرها)	☐	☐	☐	☐	☐
• برامج الرسوميات (فوتوشوب والفلاش وغيرها)	☐	☐	☐	☐	☐
• إنشاء صفحات انترنت بإستخدام فرونت بيج, دريم ويفر وغيرها.	☐	☐	☐	☐	☐
• التعامل مع محتويات المكتبات الإلكترونية على الانترنت.	☐	☐	☐	☐	☐

16. كيف حصلت على هذا المستوى من المهارات؟ (الرجاء اختيار إجابة واحدة لكل فقرة).

	مهم جدا	مهم	مهم نسبيا	غير مهم	غير قابل للتطبيق
• دراستي في المراحل السابقة	☐	☐	☐	☐	☐
• ورش العمل في الجامعة	☐	☐	☐	☐	☐
• البرامج التدريبية	☐	☐	☐	☐	☐
• التعلم الذاتي	☐	☐	☐	☐	☐
• من خلال الممارسة	☐	☐	☐	☐	☐
• من خلال الأصدقاء وزملاء العمل	☐	☐	☐	☐	☐
• غير ذلك (الرجاء التحديد).....	☐	☐	☐	☐	☐

17. ماهو تقييمك الشامل لمستوى مهاراتك في إستخدام أنظمة الجامعة الحاسوبية؟ (الرجاء اختيار إجابة واحدة).

محترف	مؤهل	متوسط	مبتدئ	لا أستخدمه
☐	☐	☐	☐	☐

18. أي نوع من الدورات التدريبية و ورش العمل في مجال تقنية الإتصالات و المعلومات متاحة في الجامعة: (الرجاء اختيار إجابة واحدة لكل فقرة).

	متوفرة لجميع الموظفين الذين يحتاجونها	متوفرة ولكن المقاعد ليست دائما متاحة	متوفرة ولكن الأماكن محدودة جدا	غير متوفرة
• تطبيقات مايكروسوفت مثل معالج النصوص (Word) والجداول الالكترونية(Excel) و العروض الالكترونية (PowerPoint)	☐	☐	☐	☐
• إستخدام تقنيات الانترنت مثل البريد الالكتروني و المتصفح	☐	☐	☐	☐
• إستخدام انظمة الخدمات الالكترونية الإدارية مثل نظام التسجيل و الدفع و الموارد البشرية	☐	☐	☐	☐

19. اذا كانت الجامعة توفر التدريب و ورش العمل في مجال تقنية الإتصالات والمعلومات للموظفين. الرجاء الإشارة إلى أي مدى تتفق مع العبارات التالية: (الرجاء اختيار إجابة واحدة لكل فقرة).

	أوافق بشدة	أوافق	محايد	لا أوافق	لا أوافق بشدة
• الجامعة توفر التدريب المناسب لتقنية الأتصالات والمعلومات المتعلقة بعملي	☐	☐	☐	☐	☐
• الجامعة تشجعني لحضور الدورات و ورش العمل في تقنية الاتصالات والمعلومات ذات الصلة بعملي	☐	☐	☐	☐	☐

- في العادة أتمكن من الحصـول على مقعد للحضـور للتدريب و ورش العمل عندما أحتاج في تقنية الإتصالات والمعلومات ☐ ☐ ☐ ☐ ☐
- التدريب و ورش العمل في تقنية الإتصالات والمعلومات عادة تعرض بشكل جيد ☐ ☐ ☐ ☐ ☐
- في العادة أجد محتويات التدريب و ورش العمل في تقنية الإتصالات والمعلومات ذات قيمة جيدة ☐ ☐ ☐ ☐ ☐

القسم الرابع: معلومات عن وجهة نظرك

20. أي مما يلي يصف موقفك بشكل صحيح تجاه التقنيات الجديدة؟ (الرجاء اختيار إجابة واحدة).

☐ لا أثق بالتقنيات الجديدة ولا أستخدمها إلا إذا اضطررت إليها
☐ عادة ما أكون من أواخر الناس الذين يتعلمون على التقنيات الجديدة
☐ عادة ما أستخدم التقنيات الجديدة بعدما يستخدمها أغلب الناس الذين أعرفهم
☐ أفضل التقنيات الجديدة واستخدمها قبل أكثر الناس المقربين
☐ أفضل التقنيات الجديدة و أكون من وائل من يجربونها ويستخدمونها

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21. الرجاء تقييم فعالية الفوائد التالية لتقنية المعلومات و الإتصالات التي تفيد من وجهة نظرك في **عملك**. (الرجاء اختيار إجابة واحدة لكل فقرة).

	اوافق بشدة	اوافق	محايد	لا اوافق	لا اوافق بشدة
• تجعل اداء المهام اكثر متعة وجذابة	☐	☐	☐	☐	☐
• تطوير من نوعية العمل المنجز	☐	☐	☐	☐	☐
• حفظ الوقت اثناء اكمال المهام	☐	☐	☐	☐	☐
• تسهل الوصول الى مصادر معلومات اكثر	☐	☐	☐	☐	☐
• تساعد في ادارة الوقت و متابعة الانشطة	☐	☐	☐	☐	☐

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22. الرجاء كتابة فوائد اخرى لاستخدام تقنية الاتصالات و المعلومات في **عملك** من وجهة نظرك؟

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23. الرجاء تقييم المقترحات التالية التي تؤثر على وجهة نظرك في إستخدام تقنية الاتصالات و المعلومات في **عملك**. (الرجاء اختيار إجابة واحدة لكل فقرة).

	مؤثر جدا	مؤثر	محايد	غير مؤثر	غير مؤثر جدا
• لا أملك وقت كافي لتعلم مهارات تقنية الاتصالات و المعلومات مهمه جديدة	☐	☐	☐	☐	☐
• لا أحتاج للتغيير, أساليب العمل الموجودة تعمل بشكل جيد بما فية الكفاية	☐	☐	☐	☐	☐
• عدم وجود التشجيع من مدرائي في العمل و من الجامعة	☐	☐	☐	☐	☐
• الدعم لتقنية الإتصالات و المعلومات غير ملائم	☐	☐	☐	☐	☐
• إمكانية الوصول معدومة أو محدودة لاجهزة الكمبيوتر و الانترنت المناسبة	☐	☐	☐	☐	☐
• إمكانية الوصول معدومة أو محدودة للبرامج المناسبة	☐	☐	☐	☐	☐
• لا أعرف كيفية إستخدام البرامج	☐	☐	☐	☐	☐
• لا أفهم أو لست مقتنع بفوائد إستخدام تقنية المعلومات والإتصالات	☐	☐	☐	☐	☐

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24. الرجاء كتابة عناصر اخرى اثرت على استخدام تقنية الاتصالات و المعلومات في **عملك** بشكل فعال من وجهة نظرك.

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25. الرجاء تقييم المقترحات التالية لزيادة استخدامك لتقنية الإتصالات و المعلومات في **المنزل**. (الرجاء اختيار إجابة واحدة لكل فقرة).

	مؤثر جدا	مؤثر	محايد	غير مؤثر	غير مؤثر جدا
• أن يكون إتصال الانترنت أكثر جوده	☐	☐	☐	☐	☐
• أن يكون إتصال الانترنت أقل سعرا	☐	☐	☐	☐	☐
• أن يكون إتصال الانترنت اللاسلكي أكثر إتاحه	☐	☐	☐	☐	☐
• تثقيف أكثر للأباء و الأشخاص ذوي السلطة عن الجوانب الإيجابية للتقنية	☐	☐	☐	☐	☐
• دعم أفضل من مقدمي أجهزة الحاسب و إتصال الانترنت	☐	☐	☐	☐	☐
• مزيد من المعلومات حول إنشـاء وصـيانة تكنولوجيا المعلومات والإتصـالات في المنزل	☐	☐	☐	☐	☐
• الترويج لفوائد إستخدام تكنولوجيا المعلومات الدراسة الجامعية	☐	☐	☐	☐	☐
• التشريعات الحكومية لحماية المستخدمين من جرائم الانترنت	☐	☐	☐	☐	☐

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26. الرجاء كتابة مقترحات أخرى اذا كان لديك لزيادة إستخدام التقنية في **المنزل** من وجهة نظرك.

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27. الرجاء تقييم المقترحات التاليه لزيادة استخدامك لتقنية الاتصالات و المعلومات في **الجامعة**. (الرجاء اختيار إجابة واحدة لكل فقرة).

	مؤثر جدا	مؤثر	محايد	غير مؤثر	غير مؤثر جدا
• زيادة في أجهزة الكمبيوتر و معامل كمبيوتر للموظفين	☐	☐	☐	☐	☐
• أن يكون إتصال الانترنت اللاسلكي أكثر اتاحه	☐	☐	☐	☐	☐
• أن يكون التدريب متاح بسهولة حول إستخدام أنظمة تكنولوجيا المعلومات والإتصالات	☐	☐	☐	☐	☐
• تقديم التدريب المبكر لإستخدام تكنولوجيا المعلومات والإتصالات	☐	☐	☐	☐	☐
• دعم تقني جيد من موظفين تكنولوجيا المعلومات والإتصالات	☐	☐	☐	☐	☐
• التحفيز القوي من المدراء في الجامعة و التعليم العالي لإستخدام أدوات تقنية المعلومات والإتصالات	☐	☐	☐	☐	☐
• تطوير و تغيير في الخطط المتسقبلية للجامعة لتفعيل إستخدام التقنية بشكل أكثر فعالية و بشكل أوسع	☐	☐	☐	☐	☐
• الترويج لفوائد إستخدام تكنولوجيا المعلومات في العمل الجامعي	☐	☐	☐	☐	☐
• تقديم دعم فني خاص بكل قسم من أقسام الجامعة	☐	☐	☐	☐	☐

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28. الرجاء كتابة مقترحات أخرى إذا كان لديك لزيادة إستخدام التقنية في **الجامعة** من وجهة نظرك.

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29. إذا كان لديك أي تعليقات أو وجهة نظر من خلال خبراتك مع التقنية في **المنزل او الجامعة**, الرجاء المشاركة في طرحها.

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القسم الخامس: المعلومات الشخصية

30. نوع الجنس:

☐ ذكر ☐ أنثى

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31. العمر: (الرجاء اختيار إجابة واحدة).

☐ 18 – 24 سنة ☐ 25 – 29 سنة
☐ 30 – 34 سنة ☐ 35 – 39 سنة
☐ 40 – 44 سنة ☐ 45 سنة او اكثر

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32. كم مدة عملك في الجامعة: (الرجاء اختيار إجابة واحدة).

☐ 1 - 5 سنوات ☐ 6 - 10 سنوات
☐ 10 – 20 سنة ☐ أكثر من 20 سنة

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33. ماهو مؤهلك العلمي؟ (الرجاء اختيار إجابة واحدة).

☐ ثانوي او اقل ☐ دبلوم
☐ بكالوريوس ☐ ماجستير
☐ دكتوراة

*** انتهت الإستبانة وشكرا لك ***

APPENDIX H: ETHICAL APPROVAL FOR QUESTIONNAIRES (PHASE 1)

Dear Fahad,

The Chair of the Social and Behavioural Research Ethics Committee (SBREC) at Flinders University considered your response to conditional approval out of session and your project has now been granted final ethics approval. Your ethics final approval notice can be found below.

FINAL APPROVAL NOTICE

Project No.:	**6096**
Project Title:	Effective Use of ICT in Saudi Arabian Universities
Principal Researcher:	Mr Fahad Altruise
Email:	fahad.alturise@flinders.edu.au
Address:	School of Computer Science, Engineering and Mathematics

Approval Date:	5 August 2013	Ethics Approval Expiry Date:	**15 December 2015**

The above proposed project has been **approved** on the basis of the information contained in the application, its attachments and the information subsequently provided with the addition of the following comment:

1. Please delete dot point 4 in point 4 of the consent form regarding treatment and services as this is not applicable for this research.

Additional information required following commencement of research:

1. Please ensure that copies of the correspondence granting permission to conduct the research from the Head of School and individual university teachers as listed in this application are submitted to the Committee *on receipt*. Please ensure that the SBREC project number is included in the subject line of any permission emails forwarded to the Committee. Please note that data collection should not commence until the researcher has received the relevant permissions (item D8).

RESPONSIBILITIES OF RESEARCHERS AND SUPERVISORS

1. Participant Documentation

Please note that it is the responsibility of researchers and supervisors, in the case of student projects, to ensure that:

- all participant documents are checked for spelling, grammatical, numbering and formatting errors. The Committee does not accept any responsibility for the above mentioned errors.
- the Flinders University logo is included on all participant documentation (e.g., letters of Introduction, information Sheets, consent forms, debriefing information and questionnaires – with the exception of purchased research tools) and the current Flinders University letterhead is included in the header of all letters of introduction. The Flinders University international logo/letterhead should be used and documentation should contain international dialling codes for all telephone and fax numbers listed for all research to be conducted overseas.
- the SBREC contact details, listed below, are included in the footer of all letters of introduction and information sheets.

This research project has been approved by the Flinders University Social and Behavioural Research Ethics Committee (Project Number 'INSERT PROJECT No. here following approval'). For more information regarding ethical approval of the project the Executive Officer of the Committee can be contacted by telephone on 8201 3116, by fax on 8201 2035 or by email human.researchethics@flinders.edu.au.

2. Annual Progress / Final Reports

In order to comply with the monitoring requirements of the *National Statement on Ethical Conduct in Human Research (March 2007)* an annual progress report must be submitted each year on the **5 August** (approval anniversary date) for the duration of the ethics approval using the annual / final report pro forma available from Annual / Final Reports SBREC web page. *Please retain this notice for reference when completing annual progress or final reports.*

If the project is completed *before* ethics approval has expired please ensure a final report is submitted immediately. If ethics approval for your project expires please submit either (1) a final report; or (2) an extension of time request and an annual report.

Student Projects

The SBREC recommends that current ethics approval is maintained until a student's thesis has been submitted, reviewed and approved. This is to protect the student in the event that reviewers recommend some changes that may include the collection of additional participant data.

Your first report is due on **5 August 2014** or on completion of the project, whichever is the earliest.

3. Modifications to Project

Modifications to the project must not proceed until approval has been obtained from the Ethics Committee. Such matters include:

- proposed changes to the research protocol;
- proposed changes to participant recruitment methods;
- amendments to participant documentation and/or research tools;
- change of project title;
- extension of ethics approval expiry date; and
- changes to the research team (addition, removals, supervisor changes).

To notify the Committee of any proposed modifications to the project please submit a Modification Request Form to the Executive Officer. Download the form from the website every time a new modification request is submitted to ensure that the most recent form is used. Please note that extension of time requests should be submitted prior to the Ethics Approval Expiry Date listed on this notice.

Change of Contact Details

Please ensure that you notify the Committee if either your mailing or email address changes to ensure that correspondence relating to this project can be sent to you. A modification request is not required to change your contact details.

4. Adverse Events and/or Complaints

Researchers should advise the Executive Officer of the Ethics Committee on 08 8201-3116 or human.researchethics@flinders.edu.au immediately if:

- any complaints regarding the research are received;
- a serious or unexpected adverse event occurs that effects participants;
- an unforseen event occurs that may affect the ethical acceptability of the project.

Mikaila Crotty
Ethics Officer and Joint Executive Officer
Social and Behavioural Research Ethics Committee

c.c A/Prof Paul Calder
Ms Denise de Vries

Mrs Andrea Fiegert and **Ms Mikaila Crotty**
Ethics Officers and Joint Executive Officers, Social and Behavioural Research Ethics Committee
Telephone: +61 8 8201-3116 I Andrea Fiegert (Monday – Wednesday)
Telephone: +61 8 8201-7938 I Mikaila Crotty (Wednesday – Friday)
Web: Social and Behavioural Research Ethics Committee

Manager, Research Ethics and Integrity – Dr Peter Wigley
Telephone: +61 8 8201-5466 I email: peter.wigley@flinders.edu.au

Research Services Office IUnion Building Basement
Flinders University
Sturt Road, Bedford Park I South Australia I 5042
GPO Box 2100 I Adelaide SA 5001

APPENDIX I: PARTICIPANTS INFORMATION SHEET (ENGLISH)

Dr Paul Calder
A/Prof in Computer Science
School of Computer Science, Engineering, and Mathematics
Flinders University
GPO Box 2100
Adelaide SA 5001
Tel: +61 8 82012827
Fax: +61 8 8201 2904
Paul.Calder@flinders.edu.au
www.flinders.edu.au/people/Paul.Calder
CRICOS Provider No. 00114A

INFORMATION SHEET

Title: 'Effective Use of ICT in Saudi Arabian Universities'

Investigators:
Mr Fahad Alturise
School of Computer Science, Engineering and Mathematics
Flinders University, Australia
Ph: +61 8 82012129
Email: altu0011@flinders.edu.au

Description of the study:
This study is part of the project entitled '*Effective Use of ICT in Saudi Arabian Universities*'. This project will investigate the problems or difficulties which universities face and why IT is not being employed effectively. On the basis of this information, I will develop solutions to improve university IT systems, which will positively affect the output of the university. This project is supported by Flinders University School of Computer Science, Engineering and Mathematics.

Purpose of the study:
It is expected that the outcome of the research will enable universities in Saudi Arabia to be more confident when adopting ICT. It will also help the government in designing policies to promote ICT that will have a positive impact on the national education overall. Lastly, this research work will also be useful for other countries (especially in Gulf States, Middle East and Muslim countries with similar traits) in providing guidelines for the adoption of ICT in universities.

What will I be asked to do?
You are invited to attend a one-on-one interview or complete a survey. The interview or survey will ask you about your experience of ICT in universities and your opinion regarding ICT adoption. The interview will take about 10 - 15 minutes and survey about 20 - 25 minutes. The interview will not be recorded, but I will take notes about important points. Completed surveys will be collected in a closed box with a slot in the lid, located in the classroom (for students) or in the school office (for staff).

What benefit will I gain from being involved in this study?
The sharing of your experiences will improve the ICT adoption in Saudi Arabian universities. We are very keen to identify obstacles and challenges so that we can develop strategies for overcoming barriers for ICT adoption. The results of the study will help all parties in ICT adoption to assess their ICT readiness by using the suggested recommendations.

Will I be identifiable by being involved in this study?
We do not need your name and you will be anonymous. Interview notes and survey results will be typed up and stored on a password-protected computer accessible only to the researchers, and will not include any identifying information. Your comments will not be linked directly to you.

Are there any risks or discomforts if I am involved?
The investigator anticipates few risks or discomforts from your involvement in this study, other than the time involved to participate. If you have any concerns regarding anticipated or actual risks or discomforts, please raise them with the investigator.

How do I agree to participate?
Participation is voluntary. You may answer 'no comment' or refuse to answer any questions and you are free to withdraw at any time without effect or consequences. A consent form accompanies this information sheet. If you agree to participate please read and sign the form.

How will I receive feedback?
Outcomes from the project will be summarised and given to you by the investigator if you would like to see them.

Thank you for taking the time to read this information sheet and we hope that you will accept our invitation to be involved.

This research project has been approved by the Flinders University Social and Behavioural Research Ethics Committee (Project Number 6096). For more information regarding ethical approval of the project the Executive Officer of the Committee can be contacted by telephone on 8201 3116, by fax on 8201 2035 or by email human.researchethics@flinders.edu.au.

APPENDIX J: PARTICIPANTS INFORMATION SHEET (ARABIC)

Dr Paul Calder
A/Prof in Computer Science

School of Computer Science,
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Flinders University
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Adelaide SA 5001
Telephone +61 8 82012827
Paul.Calder@flinders.edu.au
Facsimile +61 8 8201 2904
www.flinders.edu.au/people/Paul.Ca

أخي الكريم ،،

السلام عليكم ورحمة الله وبركاته .. وبعد ،،،

يطيب لي دعوتك للمساهمة الفاعلة في بحثي الأكاديمي من خلال المشاركة في المقابلات الشخصية والتي عبارة عن أحد الوسائل الرئيسية لجمع البيانات المطلوبة، و الأداة الرئيسية لإتمام بحثي الذي أقوم حالياً بإعداده كمتطلب أساسي لنيل درجة الدكتوراه في تقنية المعلومات من جامعة فلندرز بولاية جنوب أستراليا الأسترالية.

عنوان البحث: الاستخدام الفعال و الامثل لتكنولوجيا الاتصالات و المعلومات في الجامعات السعودية .

وصف الدراسة: هذه الدراسة هي جزء من مشروع بعنوان " الاستخدام الفعال و الامثل لتكنولوجيا الاتصالات و المعلومات في الجامعات السعودية " . و هذا المشروع التحقيق في المشاكل والصعوبات التي تواجه الجامعات بشكل عام والناشئة بشكل خاص ، ولماذا لا يتم تفعيل تقنيه المعلومات بطرق ذات فعالية عالية وعلى أساس هذه المعلومات سوف يتم وضع حلول لتجاوز هذه العقبات لتفعيل هذه التقنيات في الجامعة ، الأمر الذي سيؤثر إيجاباً على مخرجات الجامعة. هذة الدراسة بدعم من قبل جامعة فلندرز في علوم الحاسب الآلي والهندسة والرياضيات.

الغرض من الدراسة:
معرفة المشاكل والمصاعب التي تواجه الجامعات الناشئة، ولماذا لا يتم تفعيل تقنيه المعلومات بطرق ذات فعالية عالية ومن المتوقع أن نتائج البحث سوف تمكن الجامعات الناشئة في المملكة العربية السعودية أن تكون أكثر ثقة عند تفعيل تقنيه المعلومات. كما سيساعد الحكومة في وضع سياسات لتعزيز تطبيق تقنيه المعلومات التي سيكون لها أثر إيجابي على خطة التعليم الوطنية الشاملة .

طريقة المشاركة: يمكنك المشاركة من خلال الموافقة على المشاركه في هذا الاستبيان، و الاستبيان بشكل عام عبارة عن بعض الأسئلة حول رأيك بالتقنيه و فعليتها في جامعتك. وسوف يكون المسح حوالي 10– 15 دقيقة.

الفائدة المتوقعة: مشاركتك في هذه الدراسة ستساعد على تبادل الخبرات الخاصة بك لتحسين منظومة تقنيه المعلومات في الجامعات الناشئة في المملكة العربية السعودية . ونحن حريصون جداً على تحديد العقبات والتحديات التي هي مفيدة والإمكان أن تساهم في حل لتفعيل تقنيه المعلومات بشكل أوسع. وستكون نتائج هذه الدراسة مساعدة لجميع الأطراف لتقييم الوضع الحالي في الجامعات التي سيقام فيها المسح وسوف تساعد هذه الدراسه بتقديم التوصيات المقترحة والوصول إلى فهم أعمق إلى معرفة تلك العقبات والتحديات.

الخصوصية: هوية المشارك ستكون مخفية و ذلك من خلال إعطاء كل مشارك رمز لضمان الخصوصية و لن يكون هناك أي أسم أو بيانات خاصة، كما أن خصوصية المعلومات التي ستقدمها مضمونة و لن يطلع عليها سوى الأشخاص المعنيين بهذا البحث ولن تستخدم هذه المعلومات لأي هدف آخر سوى في هذا البحث و سيتم إتلاف إستبانة المسح مباشرة عند الإنتهاء من تدوين النتائج.

حق رفض المشاركة: مشاركتك في هذه الدراسة تطوعية بشكل كامل.

الموافقة على المشاركة: ردك على هذة الرسالة يعتبر موافقة ضمنية منك على المشاركة في هذة الدراسة.

وأخيرا فإن مشاركتكم في هذه الدراسة محل شكري وتقديري ...

الباحث
فهد محمد الطريس

inspiring achievement

APPENDIX K: VERBAL SCRIPT FOR RECRUITING PARTICIPANTS (ENGLISH)

Verbal script for recruiting survey participants

Effective Use of ICT in Saudi Arabian Universities

Firstly, I would like to introduce myself. My name is Fahad Alturise and I am doing the Doctor of Philosophy in Computer Science (Enterprise Information Technology) in Flinders University in Australia. Also, I am a lecturer in College of Science and Arts at Qassim University. I would like to invite you to participate in this research project. You should only participate if you want to; choosing not to take part will not disadvantage you in any way.

I am undertaking research leading to the production of a thesis on the subject of "Effective use of ICT in Saudi Arabian universities". I want to discover and explain the problems or difficulties which universities face and why IT is not being employed effectively. On the basis of this information, I will develop solutions to improve university IT systems, which will positively affect the output of the university.

I will be interviewing teaching staff, IT support staff, and administrative staff at a range of universities to find out what IT-related problems they face in their work, how they overcome them, and what changes they believe would improve the effectiveness of IT in their workplace.

I would be most grateful if you would volunteer to assist in this project by granting an interview. About 20 minutes of your time would be required. Be assured that any information provided will be treated in the strictest confidence and that you will not be individually identifiable in the resulting thesis. You are, of course, entirely free to discontinue your participation at any time or to decline to answer particular questions.

If there is anything that is not clear or you would like more information, please ask. If you have any questions or would like to receive further information about the project or a copy of the results when are available, please contact me at fahad.alturise@flinders.edu.au or my supervisor, Dr Paul Calder at the address above.

Thank you for your attention and assistance.

Yours sincerely

Fahad Alturise

PhD Candidate

This research project has been approved by the Flinders University Social and Behavioural Research Ethics Committee (Project Number 6096). For more information regarding ethical approval of the project the Executive Officer of the Committee can be contacted by telephone on 8201 3116, by fax on 8201 2035 or by email human.researchethics@flinders.edu.au.

APPENDIX L: INTRODUCTION LETTER FOR RESEARCHER (ENGLISH)

Dr Paul Calder
A/Prof in Computer Science
School of Computer Science, Engineering, and Mathematics
Flinders University
GPO Box 2100
Adelaide SA 5001
Tel: +61 8 82012827
Fax: +61 8 8201 2904
Paul.Calder@flinders.edu.au
www.flinders.edu.au/people/Paul.Calder
CRICOS Provider No. 00114A

To Whom It May Concern:

This letter is to introduce Mr Fahad Alturise who is a PhD candidate student in the School of Computer Science, Engineering and Mathematics at Flinders University in Australia. He will produce his student card, which carries a photograph, as proof of identity.

Fahad is undertaking research leading to the production of a thesis on the subject of "Effective use of ICT in Saudi Arabian universities"

He would be most grateful if you would volunteer to assist in this project by granting an interview or completing a questionnaire that covers certain aspects of this topic. No more than 20 minutes of your time would be required.

Be assured that any information provided will be treated in the strictest confidence and none of the participants will be individually identifiable in the resulting thesis, report or other publications. You are, of course, entirely free to discontinue your participation at any time or to decline to answer particular questions.

Any enquiries you may have concerning this project should be directed to me by post, telephone or email at the address below.

Thank you for your attention and assistance.

Yours sincerely

Assoc Prof Paul Calder
School of Computer Science, Engineering and Mathematics
GPO Box 2100, Adelaide 5001, South Australia
Telephone: +61 8 82012827
Email: paul.calder@flinders.edu.au

inspiring achievement

APPENDIX M: INTRODUCTION LETTER FOR RESEARCHER (ARABIC)

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الى من يهمة الامر

هذا الخطاب هو تعريف بالسيد فهد الطريس طالب في تخصص تقنية المعلومات في كلية علوم الحاسب والهندسة والرياضيات في جامعة فلندرز باستراليا.
سوف يقدم بتقديم بطاقة الطالب الخاصة به وهي تحتوي على صورة شخصية له.
فهد يقوم ببحث للوصول إلى نتائج خاصة بأطروحته والتي بعنوان"الاستخدام الفعال و الامثل لتكنولوجيا الاتصالات و المعلومات في الجامعات السعودية".
سوف يكون في غاية الامتنان لو تفضلتم بالتطوع لمساعدته في هذا المشروع من خلال منحة الفرصة لإجراء مقابلات و إكمال الاستبيان التي تغطى جوانب معينة من أطروحته. وهذا الامر لن يتطلب من وقتكم اكثر من 20 دقيقة.
تأكد انه سيتم التعامل مع أي من هذا المعلومات بسرية تامة وانه لن يتم الإشارة إلى أي من المشاركين بشكل خاص أثناء الرسالة. وبالطبع يحق للمشارك التوقف عن المشاركة في أي وقت أو عدم الإجابة على أي من الأسئلة.
إذا كان لديكم أي استفسار بإمكانكم التواصل معنا عن طريق البريد أو الهاتف أو البريد الالكتروني على العناوين الموضحة في الأسفل.
شكرا لكم على حسن اهتمامكم و تعاملكم.
تفضلوا بقبول فائق احترامي.

د.باول كالدور
كلية علوم الحاسب والهندسة والرياضيات
صندوق بريد 2100، اديلد، 5001، جنوب استراليا
هاتف: +61 8 82012827
البريد الالكتروني:paul.calder@flinders.edu.au

inspiring achievement

APPENDIX N: ETHICAL APPROVAL FOR INTERVIEW (PHASE 3)

MODIFICATION (No.1) APPROVAL NOTICE

Project No.: **6096**

Project Title: Effective Use of ICT in Saudi Arabian Universities

Principal Researcher: Mr Fahad Altruise

Email: fahad.alturise@flinders.edu.au

Modification Approval Date: 4 November 2014

Ethics Approval Expiry Date: **15 December 2015**

I am pleased to inform you that the modification request submitted for project 6096 on the 28 October 2014 has been reviewed and approved by the SBREC Chairperson. A summary of the approved modifications are listed below. Any additional information that may be required from you will be listed in the second table shown below called 'Additional Information Required'.

Approved Modification(s)	Details of approved modification(s)	
Change of personnel:	Addition of researchers	1. Dr Brett Wilkinson
	Removal of researchers	1. Dr Denise De Vries
	Principal Researcher change	None.
Modified research protocol:	1. Approval of the research protocol for phase 2 as outlined in the modification request.	
Documentation Amendments and/or Additions	Amended Documents	None.
	New Documents	1. Report on proposed solution strategies 2. Arabic translation of report on proposed solution strategies 3. Interview questions 4. Arabic translation of interview questions 5. Email script for recruiting interviewees 6. Arabic translation of email script for recruiting interviewees.

	Additional Information Required
1.	

APPENDIX O: EMAIL SCRIPT FOR RECRUITING INTERVIEWEES (ENGLISH)

Email script for recruiting interviewees

Dear...

I am a PhD student at Flinders University under the supervision of Associate Professor Paul Calder (contact details below), and I am conducting research for a thesis to be titled "Effective User of ICT in Saudi Arabian Universities".

Phase 1 of my research involved gathering information from students, academic staff, and technical staff at several Saudi and gulf state universities to identify barriers to effective implementation of ICT in the Saudi Arabian university environment. As you may recall, you were one of the participants in phase 1; I spoke with you on <<date of previous interview>>.

As a result of information gathered so far, I have developed a brief report identifying the key barriers and outlining proposed solution strategies that I believe will help overcome those barriers. In the next phase of the research I plan to validate these strategies by interviewing key stakeholders in Saudi Arabian universities, and I'm hoping you will agree to an interview.

I have attached the report, together with a list of questions to indicate what the interview would be about. If you are willing and available, please read the report and then let me know when would be a good time for us to meet and discuss your feedback and any other comments you wish to make. I will be in Saudi Arabia during <<dates>> and may be able to meet in person, but I expect that it might be more convenient to meet via Skype. I anticipate that the interview will last no more than 30 minutes.

The information I gather from the interviews will be used to refine my solution strategies and to gauge the likelihood of their success. Of course, I will ensure that your name and personal details are kept confidential and that you cannot be identified from data in my thesis or other publications.

Please let me know if there is any other information you require.

Sincerely,

Fahad Alturise

altu0011@flinders.edu.au

My supervisor can be contacted by email at paul.calder@flinders.edu.au

This research project has been approved by the Flinders University Social and Behavioural Research Ethics Committee (Project Number 6096). For more information regarding ethical approval of the project the Executive Officer of the Committee can be contacted by telephone on 8201 3116, by fax on 8201 2035 or by email human.researchethics@flinders.edu.au.

APPENDIX P: EMAIL SCRIPT FOR RECRUITING INTERVIEWEES (ARABIC)

صيغة الاميل المقترح لإرساله للمشاركين في المقابلة

عزيزي.....

أنا فهد الطريس طالب في مرحلة الدكتورة في تخصص علوم الحاسب (تقنية المعلومات) في جامعة فلندرز في استراليا تحت اشراف الدكتور باول كالدر (معلومات الاتصال في الاسفل). أنا أقوم ببحث للوصول إلى نتائج خاصة بأطروحتي والتي بعنوان"الاستخدام الفعال و الامثل لتكنولوجيا الاتصالات و المعلومات في الجامعات السعودية".

المرحله الاولى من البحث تمت بجمع بيانات من الطلاب، اعضاء هيئه التدريس و الموظفين الاداريين و التقنيين في عده جامعات سعودية و خليجية لتحديد العقبات التي تؤثر على بيئة تفعيل تقنية الاتصال و المعلومات. و بما انك كنت احد المشاركين في المرحلة الاولى، اود الحديث معك لاختبار ماتم التوصل اليه من خلال المرحله الثانيه وهي الاستراتيجيه المقترحه لمحاوله تجاوز هذه العقبات.

بناء على ما تم التوصل اليه، قمت بكتابة تقرير يوضح اهم المعوقات و الاستراتيجية المقترحة لتجاوز هذه المشاكل. في المرحلة الثانية من البحث اقوم باختبار هذه الاستراتيجيات عن طريق المقابلة الشخصية مع اهم العناصر في الجامعات التي من الممكن ان تؤثر في نجاح هذه الاستراتيجيه و اتمنى ان توافق على عمل المقابلة.

قمت بارفاق التقرير مع مجموعة من الاسئلة التي سوف تتمحور حولها المقابلة. اذا من الممكن اتمنى قراءت التقرير و الاسئله ومن ثم الرجاء تحديد الوقت المناسب للاجتماع لمناقشة ما تم التوصل له من خلال وجهه نظرك و اي اضافات اخرى تود اضافتها. سوف اكون متواجد في المملكة العربية السعودية في تاريخ (.....) و سوف اكون مستعد لمقابلتك شخصيا، و بالامكان اجراء المقابلة عن طريق برنامج سكايب اذا كان هذا مناسب لكم. من المتوقع ان لا تتجاوز المقابلة مدة 30 دقيقة.

المعلومات التي سوف يتم حصولها من خلال المقابلة سوف تستخدم للوصول لاستراتيجية لحل هذه المشاكل. تأكد من أنه سيتم التعامل مع أي من المعلومات الشخصية المقدمة بسرية تامة كما أن لن يتم الإشارة إليها بشكل خاص أثناء الاطروحة او اي اوراق علمية.

بإمكانك السؤال عن أي جزء غير واضح أو إذا كنت تود الحصول على معلومات إضافية.

مع خالص التقدير،،،

فهد الطريس

altu0011@flinders.edu.au

بالامكان التواصل مع المشرف عن طريق الاميل paul.calder@flinders.edu.au

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This research project has been approved by the Flinders University Social and Behavioural Research Ethics Committee (Project Number 6096). For more information regarding ethical approval of the project the Executive Officer of the Committee can be contacted by telephone on 8201 3116, by fax on 8201 2035 or by email human.researchethics@flinders.edu.au.

APPENDIX Q: STRATEGIES SOLUTION REPORT (ENGLISH)

Effective Use of ICT in Saudi Universities

Problems and solution strategies

Introduction

Compared with other Gulf State universities, Saudi Arabian universities experience many problems in effectively implementing and using ICT. Using surveys and interviews, we obtained data from students, faculty members, and administrative staff in 10 Saudi universities and 5 Gulf States universities. The data shows that the Gulf States universities get considerably more benefit from IT than the Saudi universities, despite all the countries concerned having similar budgets, sharing similar cultures and having good infrastructure.

As a result of current problems, many Saudi universities still utilise paper-based processes that cause delays and lead to other difficulties. For example, faculty members lose much time in executing teaching duties such as marking, preparing lectures, and administrative work, and they experience communication problems as well. Moreover, students endure many problems with enrolments, contact with staff, familiarity with technology and other issues. Finally, administrative personnel lack skills to deal with technological issues and their qualifications for using IT are low or non-existent. Also, Saudi universities staff suffer from the lack of awareness and not being serious about their workplace duties and obligations.

Some problems emerge as a consequence of other issues such as lack of motivation. It is a consequence of many problems in universities such as lack of ICT infrastructure, lack of training, lack of motivation and lack of leadership. This report describes the main problems identified and proposes potential solutions. The emphasis is on solutions that are practical to implement in the affected universities. The two main types of solutions are cultural and technical in character. It is very important to implement solutions so that the maximum benefit is obtained for all parties involved. This research also draws on the results of previous studies.

The next phase of the research is to seek feedback from key stakeholders to help the solution strategies. The overall goal for the project is find solutions that will improve the situation in Saudi Arabian universities, although it is likely that such solutions may also help other developing countries facing similar challenges.

Problems and Challenges

From the survey data we identified three main problem areas and associated challenges that are preventing effective use of IT in Saudi universities.

Poor Infrastructure

Many newly established universities lack necessary ICT infrastructure, which should incorporate student computer laptops, access to desktop devices and office-based Internet, Wi-Fi internet connections, smart classrooms, PCs for staff, and other software devices. Some new universities have acquired infrastructure as a consequence of merging with an existing university, but even then managing these problems is still critical, and leadership is frequently lacking in the IT department. Good ICT management is especially challenging for universities with several campus sites; some universities have more than 20 campuses spread across different cities, which requires large budget outlays to keep the infrastructure functioning.

Low Skills

University personnel often lack skills in utilising ICT software and hardware, largely because of a shortage of training. Even where faculty members and other staff have good ICT skills, the poor skills of co-workers cause delays and inefficiency because the large gulf between skilled and unskilled colleagues results in duplicated work and communication difficulties. Furthermore, the lack of ICT skills in teaching staff has a 'knock on' effect for students who in turn lack skills because staff do not encourage them to use ICT in their studies or other administrative tasks.

Lack of Motivation

Many staff do not feel motivated to engage with available ICT technologies or systems. Often, faculty members and administrative staff do not use IT in their work because they see such work as the responsibility of others, or because they see a lack of guidance from university decision-makers or policy-makers. They see the workplace as lacking the kind of support that would encourage them to use new technology or update their skills. Poor motivation in employees and poor local work culture can have serious effects on improving skills and using IT in the workplace. For example, a common problem is that faculty members with high teaching loads are not motivated to spend additional time to acquire new ICT skills, especially if they see their colleagues as having lower teaching loads.

Stakeholders

Solutions to these problems must be linked to university policies and practices in order to be effective. The most important people who can help with these problems are university managers and directors who have the authority and responsibility for implementing ICT, technical staff and external partners who will implement and support the ICT infrastructure, and of course the teachers and administrative staff who will use ICT in their day-to-day work.

Decision makers

Decision-makers should choose a qualified and highly experienced IT team that can develop both basic and more advanced ICT solutions. The most difficult step is changing from an old system to a new one and this means implementing change at all levels in the university. IT leaders should ensure that staff are appropriately trained to deal with hardware and software issues. The decision makers include university presidents, directors, faculty or departmental heads, deans and senior administrative staff.

Technical support

IT departments have many duties and they will have to replan their functions using qualified and experienced people. ICT infrastructure will have to be reconfigured so that it is used in a more effective way. Moreover, the Internet should be made available everywhere with the appropriate restrictions in place. Good technical support will help users to use services in all campuses, schools, departments, libraries and labs. Technical support includes IT departmental staff, IT staff in the schools and IT staff in administrative departments.

Teachers

Faculty teachers should be active by using ICT much more effectively. They must encourage students to use technology such as email for contact, access to electronic materials, submit assignments electronically, and learn about other features of the online learning management system. Teachers include full-time and part-time faculty members and training centre staff.

Administrators

Administrative staff should understand the advantages of working electronically compared to paper-based systems. Administrators include all staff working at a university, such as full-time and part-time employees, and contract workers.

Solution Strategies

We propose solution strategies that can be categorized as either cultural solutions, which focus on the people involved and the way they work, or technical solutions, which apply technology to enable and support that work. Neither type of solution is sufficient without the other. Without technical support, the benefits of ICT are unavailable. Without cultural support, the money spent on implementing ICT is likely to be wasted.

Attractive incentives (cultural)

Universities should boost staff motivation by providing attractive incentives for improving workplace practices in the area of ICT. Universities have large government budgets and the money should be spent on training to learn incentive-related skills. This means in effect encouraging staff to improve their workplace attitudes and skills through the process of self-learning. Staff must be encouraged as much as possible to attend training courses and improve their sense of motivation and how to complete procedures, processes, routines, etc. that are IT-based. Incentives will have to be evaluated by university decision-makers in terms of staff members' age, qualifications, experience and what will be required in the future.

Up-to-date policies and rules (cultural)

Government and university decision makers should update all university missions' statements, policies and rules concerning IT and where and how it is used. Universities have to show staff these policies and rules and they should be worded in ways that give them the incentive to improve their IT skills. Penalties should be introduced if staff do not attain the bare minimum of IT skills such as using email, organizing desktop spaces, online folders, etc. The university authorities should monitor staff usage and the specified minimum IT services that are required in university teaching and administrative work. This will be fairly easy because most staff are young and faculty members have worked or studied in overseas universities, such as in the USA, UK and Australia where IT usage is routine. Resistance against these policies and rules may emerge from older staff who should be given time to adjust to the newer policies and procedures.

Comprehensive usage monitoring (technical)

A comprehensive ICT usage monitoring system could track staff and student use of university ICT infrastructure, which would help university managers and IT leaders to identify which sectors of the university are not making effective use of ICT services.

Information gathered by the monitoring system can be used to support cultural solutions; for example it could identify areas where incentives are not working well, or circumstances that cause policies to be ineffective. As an added benefit, the monitoring system can also serve to identify breaches of safety and security.

High-quality online training (technical)

Online training is an easy way to develop and update skills for staff and students. Universities should offer online training courses to suit a wide range of skill levels and needs. Staff should be required to demonstrate competence in the skills needed for their situation, with regular assessments to ensure skills are up to date and the results used to direct users to the training courses appropriate to their current skill level. To be effective, courses must be designed by specialists such as those employed or contracted by IT companies that are familiar with university requirements.

Universal access to ICT infrastructure (technical)

Universities should make ICT resources available to all staff and students. Where possible, access should be provided to the full resources of the Internet. If such access is not possible or not desirable, for example in campuses that are far from the main campus or that cannot afford universal access, a private staff-only Intranet should be implemented instead. Universal access to ICT infrastructure will encourage staff involvement in communication and collaboration, save time and reduce costs, provide access to business information and news, and facilitate on-line training and e-learning in the user's work context.

APPENDIX R: STRATEGIES SOLUTION REPORT (ARABIC)

الإستخدام الأمثل لتقنية الإتصالات و المعلومات في الجامعات السعودية

المشاكل وإستراتيجيات الحل

المقدمة

مقارنة بالجامعات الخليجية، الجامعات في المملكة العربية السعودية تواجه العديد من المشاكل في تطبيق و استخدام تقنية الاتصال و المعلومات بشكل فعال. وهذه المشاكل تم التاكد منها بواسطة البيانات التي تم جمعها عن طريق الاستبانات و المقابلات الشخصية من أصحاب المصلحة (أعضاء هيئة تدريس، طلاب، موظفين إداريين) في الجامعات في دول الخليج و مقارنتها بالحال في الجامعات السعودية. هذا تم عن طريق زيارة 10 جامعات سعودية اكثرها جامعات جديدة و 5 جامعات خليجية. البيانات اظهرت ان الجامعات الخليجية مستفيدة اكثر من تقنية المعلومات من الجامعات في السعودية، مع العلم أن دول الخليج تمتلك نفس الميزانيات، مشتركة في الثقافات إلى حد كبير و تملك بنية تحتية جيدة.

و نتيجة لهذة المشاكل الحالية، الجامعات السعودية مستمرة في إجراء الأعمال بطريقة ورقية و التي تسبب في تأخر إجراء الأعمال و التي تؤدي لمشاكل اخرى. على سبيل المثال، أعضاء هيئة التدريس يخسرون الكثير من الوقت لأداء اعمالهم المتعلقة بالتعليم كتسجيل الدرجات، كتابة المحاضرات، الأعمال الادارية و المشاكل في الإتصال كذلك. اضف الى ذلك الطلاب يواجهون عدة مشاكل في تسجيل المواد، التواصل مع أعضاء هيئة التدريس، التعود على استخدام التقنية و بعض المشاكل الأخرى. اخيرا الموظفين لا يملكون المهارات المطلوبة للتعامل مع التقنية او المؤهلات العلمية التي تساعد في استخدام تقنية المعلومات أقل من المطلوب. أيضا الجامعات السعودية تعاني من عدم جدية الموظفين حول عملهم و واجباتهم و التزاماتهم العملية.

بعض المشاكل هي محصله لبعض الأسباب و الأحداث الأخرى على سبيل المثال نقص في الدافعية والتي هي نتيجة لبعض المشاكل الاخرى كنقص البنية التحتية لتقنية الإتصالات و المعلومات، نقص في التدريب، نقص في الدافعية لدى الإداراة. في هذه الورقة سوف يتم الاشارة الى المشاكل الرئيسية التي تؤثر على استخدام تقنية الاتصال و المعلومات في الجامعات السعودية و استعراض مقترح لأفضل الحلول لهذه المشاكل التي من الممكن أن تؤثر في الجامعات السعودية. سوف ينصب التركيز على الحلول العملية ليتم تنفيذها في الجامعات المتضررة. سوف يتم استعراض نوعين رئيسيين من الحلول وهي الحلول المتعلقة بثقافة و تشريعات العمل و الحلول التقنية. من المهم جداً تطبيق هذه الحلول ليتم التوصل للفائدة القصوى لجميع الأطراف المعنية. هذا البحث يعتمد على نتائج الدراسات السابقة.

هذا الجزء من البحث هو للحصول على وجهة نظر أصحاب المصلحة في الجامعات السعودية ليتم التوصل إلى الحلول و الإستراتيجيات المناسبة للحل. الهدف الرئيس من هذا البحث هو محاولة المساعدة في تطوير الحالة الحالية في الجامعات السعودية خصوصا و الخليجية بشكل عام و من الممكن أيضاً أن تساعد الدول الناشئة التي تواجه مثل هذة المشاكل.

المشاكل و التحديات

من خلال نتائج المسح تم التوصل إلى عدد من المشاكل تم تحديد أهم ثلاثة مشاكل و تحديات رئيسية منها والتي أدت إلى التاثير سلباً على فعالية تقنية المعلومات في الجامعات السعودية .

ضعف البنية التحتية

العديد من الجامعات الجديدة التي أنشئت حديثاً و لم تكون نتيجة للدمج مع جامعات أخرى مثل جامعة شقراء تفتقر الى البنية التحتية الجيدة لتقنية الإتصالات و المعلومات المناسبة التي يجب أن تتضمن معامل أجهزة الكمبيوتر للطلاب، والوصول إلى أجهزة الكمبيوتر والإنترنت، اتصال الإنترنت اللاسلكي، والفصول الدراسية الذكية، وأجهزة الكمبيوتر للموظفين، وأخرى. ومن ناحية أخرى، بعض الجامعات لديهم البنية التحتية نتيجة الدمج بين جامعات قائمة مع بعضها البعض مثل جامعة القصيم،ولكن ومع توفر البنية التحتية إلا أن إدارة هذه البنية التحتية المتاحة وهي من مسئولية قسم تقنية المعلومات لا تزال حرجة و النقص في القيادات الجيدة في هذه الادارة تسبب مشكلة كبيره في مثل هذه الجامعات. الإدارة الجيدة لتقنية الإتصالات و المعلومات هو تحدي كبير يواجه الجامعات خصوصا تلك التي تمتلك عدد من الفروع للحرم الجامعي وبعض الجامعات لديها أكثر من 20 فرعاً منتشرة في مدن مختلفة والتي تتطلب نفقات ميزانية كبيرة لإبقاء بنيتها التحيتية تقوم بالعمل المطلوب .

مهارات منخفضة

موظفو الجامعات غالبا يملكون مهارات أقل من المطلوب لتساعده في التعامل مع تقنية الاتصالات والمعلومات بالنسبة للبرمجيات و البرامج والأجهزة على حدٍ سواء بسبب النقص في التهيئة والتدريب. حتى وإن كان أعضاء هيئة التدريس بالجامعات السعودية وغيرهم من الموظفين يملكون مهارات جيدة في تقنية المعلومات و الإتصالات إلا أن النقص الشديد بالنسبة لزملائهم الأخرين في العمل يسبب التأخير وعدم الكفاءة بسبب الفجوة الكبيرة بين الموظفين المهرة و غير المهرة و التي تؤدي إلى صعوبات في العمل بشكل متواصل و متكرر. علاوة على ذلك، النقص في مهارات استخدام تقنية الاتصالات والمعلومات بالنسبة لأعضاء هيئة التدريس له تأثير على الطلاب الذين بدورهم يفتقرون إلى مهارات تقنية المعلومات لأن أعضاء هيئة التدريس لا يشجعونهم على استخدام تقنية الإتصالات والمعلومات في دراستهم أو المهام الإدارية الأخرى.

عدم وجود الحافز

الكثير من الموظفين لا يشعرون بدافعية للتعامل مع تقنية الإتصالات والمعلومات أو الأنظمة المتاحة في الجامعة. عادة أعضاء هيئة التدريس والموظفين الإداريين لا يقومون باستخدام تقنية المعلومات المتاحة في العمل لأنهم يرون أن هذه الأعمال هي من مسئوليات الأخرين وأن قيامهم بها تعتبر مسئوليات إضافية عليهم أو لإنهم يرون عدم وجود سياسات و توجيهات لاستخدامها من قبل صانعي القرار في الجامعة. هم يرون أن افتقار بيئة العمل للبنية التحتية والمتطلبات الرئيسية و إلى الدعم من خلال تشجيعهم على استخدام التقنية الجديدة و تطوير مهاراتهم هو نوع من الدعم لوجهة نظرهم تجاه عدم استخدام التقنية. النقص في الدافعية في الموظفين وفي ثقافة العمل المحلية قد يكون لها التأثير الأكبر على تطوير المهارات و استخدام التقنية في بيئة العمل. على سبيل المثال، من المشاكل الشائعة هي أن يملك عضو هيئة التدريس حمل تدريسي عالي من المحاضرات و التي بدوره يؤدي إلى عدم وجود دافعية لاستثمار وقت إضافي لاكتساب مهارات جديدة في تقنية المعلومات والاتصالات الجديدة خصوصا عندما تكون الأحمال الدراسية غير عادلة بين الأعضاء.

أصحاب المصلحة

الحلول لهذه المشاكل يجب أن تكون على علاقة بالتشريعات والأنظمة والممارسات في الجامعة لتكون ذات فعالية. أهم الفاعلين الذين من الممكن أن يكون لهم الأثر الأكبر في تجاوز هذه المشاكل هم المدراء والمسؤلين الذين يملكون السلطة والقدرة على تطبيق تقنية الإتصالات والمعلومات كالفنيين والشركاء من خارج الجامعة الذين يقومون بالدعم و التنفيذ في البنية التحتية لتقنية الإتصالات والمعلومات وبالتاكيد اضف إليهم أعضاء هيئة التدريس والموظفين الإداريين الذين لهم تعامل وصلة يومية بهذه الأنظمة.

صناع القرار

من المهم جدا لصناع القرار اختيار المؤهلين وذوي الخبرة العالية للعمل في مجال تقنية المعلومات في الجامعة التي يمكن أن تطور الحلول الأساسية والمتقدمة في مجال تقنية المعلومات والإتصالات. الخطوة الأكثر صعوبة هي التغيير من النظام القديم إلى النظام الجديد، وهذا التغيير يجب أن يكون على جميع المستويات في الجامعة. المسئولين في مجال تقنية المعلومات في الجامعة يجب أن يتاكدوا أن جميع العاملين على قدر من التدريب والكفاءة ليستطيعو التعامل مع الأجهزة و الأنظمة. وصناع القرار في الجامعات تشمل رؤساء الجامعات و الوكلاء، رؤساء الأقسام، وعمداء الكليات وكبار الموظفين الإداريين.

الدعم الفني

أقسام تقنية المعلومات لديها العديد من المهام، يجب عليهم إعادة النظر في الخطة وإعادة التخطيط باستخدام الأشخاص المؤهلين وذوي الخبرة في تقنية المعلومات والإتصالات. البنية التحتية سوف تضطر إلى إعادة تشكيلها بحيث يتم استخدامها على نحو أكثر فعالية. وعلاوة على ذلك، ينبغي توفير الإنترنت في كل مكان في الجامعة مع وضع القيود المناسبة. الدعم الفني الجيد يكون عن طريق مساعدة المستخدمين في استخدام الأنظمة و التقنية في جميع أنحاء الجامعة من الأقسام والإدارات والمكتبات والمختبرات. ويشمل الدعم الفني موظفي إدارة تقنية المعلومات وموظفي تقنية المعلومات في الكليات وموظفي تقنية المعلومات في الإدارات الإدارية.

أعضاء هيئة التدريس

أعضاء هيئة التدريس يجب أن يكونو أكثر فعالية في استخدام تقنية المعلومات والإتصالات. يجب أن يقومو بتشجيع الطلاب على استخدام التقنية مثل البريد الإلكتروني للتواصل، والوصول إلى المواد الدراسية إلكترونياً، وتقديم الواجبات إلكترونياً، والتعرف على الميزات الأخرى لنظام إدارة التعلم عبر الإنترنت. و يشمل أعضاء هيئة التدريس جميع المدرسين سواء العاملين بدوام كامل او جزئي من أعضاء هيئة التدريس وغير المتفرغين وموظفين مركز التدريب.

الموظفين الاداريين

الموظفين الإداريين يجب أن يفهموا أن العمل إلكترونياً هو أفضل بكثير من اللجوء إلى النظم الورقية على الرغم من الصعوبات الأولية. والموظفين الإداريين في الجامعة يشملون الموظفين بدوام كامل وبدوام جزئي، والعاملين بنظام التعاقد.

إستراتيجيات الحل

قمنا باقتراح عدد من الإستراتيجيات للحل والتي من الممكن أن تصنف إما حلول ثقافية والتي تركز على الموظفين المعنيين وطريقتهم في العمل أو حلول تقنية والتي تكون عن طريق استخدام التقنية للمساعدة في العمل. كلا النوعين من الحلول غير كافي بدون الاخر. وبدون الدعم الفني الجيد، فإن الفوائد لتقنية المعلومات والإتصالات سوف تكون غير ممكنه. أيضا بدون العمل الجيد على تحسين ثقافه العمل والعاملين فإن الأموال والميزانيات التي سوف تصرف في تطبيق وتنفيذ تقنية الإتصالات والمعلومات سوف من المرجح أن تكون ذات غير جدوى وتضيع

حوافز مغرية (ثقافي)

الجامعات السعودية يجب عليها زيادة الدافعية للموظفين من خلال منحهم الحافز لتحسين التعامل في أماكن عملهم في مجال تقنية المعلومات والإتصالات. الجامعات السعودية لها ميزانيات حكومية كبيرة ويجب أن تخصص جزء من المال على تدريب الموظفين لتعليمهم المهارات المتعلقة بالعمل و التعامل مع التقنية. وهذا يعني في الواقع تشجيع الموظفين على تحسين عاداتهم في أماكن عملهم والمهارات من خلال عملية التعلم الذاتي. يجب تشجيع الموظفين قدر الإمكان لحضور الدورات التدريبية وتحسين شعورهم تجاه التقنية. الحوافز يجب أن يتم تقييمها من قبل صناع القرار في الجامعة من حيث العمر والمؤهلات والخبرة للموظفين وما سيكون مطلوبا في المستقبل.

تحديث القوانين و الانظمة (ثقافي)

صناع القرار في التعليم العالي والجامعات في المملكة العربية السعودية يتوجب عليهم تحديث بيانات جميع ما يتعلق بالجامعات والسياسات والقواعد المتعلقة بتقنية المعلومات وأين وكيف يتم استخدامها. الجامعات يجب عليها إظهار هذه السياسات والقواعد للموظفين ويجب أن تصاغ بطرق تمنحهم الحافز لتحسين مهارات تقنية المعلومات. ينبغي وضع عقوبات على الموظفين الذين لا يقومون باستخدام الحد الأدنى من تقنية المعلومات او لا يملكون المهارات لذلك مثل استخدام البريد الإلكتروني، والتعامل مع الجهاز المكتبي والمجلدات على شبكة الإنترنت، وما إلى ذلك. إضافة إلى ذلك، ينبغي على السلطات في الجامعة مراقبة استخدام الموظفين وخدمات تقنية المعلومات و مراقبة الحد الادنى المطلوب في التدريس الجامعي و العمل الإداري. وسوف يكون من السهل إلى حد ما تطبيق هذه الحلول لأن معظم الموظفين هم من الشباب و أعضاء هيئة التدريس لهم خبرة في الدراسة في جامعات في الخارج، مثل الولايات المتحدة الأمريكية والمملكة المتحدة وأستراليا حيث استخدام تقنية المعلومات هو أمر روتيني. المقاومة ضد هذه السياسات والقواعد قد تنشأ من الموظفين كبار السن الذين ينبغي أن يعطو الوقت الكافي للتكيف مع أحدث السياسات والإجراءات.

مراقبة الاستخدام الشامل (تقني)

نظام مراقبة الإستخدام الشامل لتقنية الاتصالات والمعلومات يسمح متابعة استخدام أعضاء هيئة التدريس والطلاب للبنية التحتية لتقنية الإتصالات والمعلومات والتي تساعد مدراء الجامعة و مدراء تقنية المعلومات للتوصل الى المكان الذي لا يستخدم تقنية الإتصالات والمعلومات بطريقة فعالة. المعلومات التي يتوصل إليها من خلال هذه التقنية بالإمكان استخدامها لدعم الحلول الثقافية على سبيل المثال من الممكن تحديد الجهة التي لديها الحافز المادي غير فعال بشكل جيد او الظروف التي تجعل بعض القوانين غير فعالة. إضافة إلى هذه المزايا أن نظم المراقبة أيضاً يخدم في تحديد المخالفات والتعديات على النظام من خلال الإخلال بأمن وسلامة النظام.

تدريب عالي الجودة على الانترنت (تقني)

التدريب الإلكتروني هو الوسيلة السهلة لتطوير مهارات الموظفين والطلاب. الجامعات يجب أن تقدم دورات تدريبية مختلفة على شبكة الإنترنت والتي من المهم أن تتناسب مع شريحة واسعة من مختلف المهارات والإحتياجات. ينبغي أن يطلب من الموظفين إثبات الكفاءة في المهارات اللازمة لأعمالهم، مع تقييمات منتظمة لضمان أن تكون المهارات محدثة، ونتائج هذه التقييمات يجب أن تستخدم لتوجية المستخدمين للدورات التدريبية المناسبة لمستوى مهاراتهم الحالية. ولضمان فاعلية هذه الدورات التدريبية، يجب أن تكون مصممة من قبل متخصصين في هذا المجال على سبيل المثال العاملين في شركات تقنية المعلومات الذين هم على دراية بأنظمة ومتطلبات الجامعة.

الوصول إلى تقنية المعلومات والاتصالات (تقني)

يجب على الجامعة أن توفر الوصول الأمن والسهل لموارد ومصارد تقنية الإتصالات والمعلومات لكل الموظفين والطلاب على حد سواء. وإذا كان من الممكن أيضاً أن توفر لهم كامل المصادر من خلال الإنترنت. وإذا كان من غير الممكن الوصول لها كعلى سبيل المثال بعض الفروع للجامعات تكون بعيدة عن الحرم الجامعي الرئيسي أو لايكون هناك إمكانية لتوفير الوصول لجميع المصادر التقنية فإنه ينبغي على الأقل استبدالها بشي مؤقت كعمل شبكة داخلية خاصة للموظفين. الوصول الشامل إلى تقنية الإتصالات والمعلومات من دورها أن تدفع بالموظفين وتحفزهم للتواصل والتعاون والذي بدوره سوف يساعدهم في توفير الوقت وخفض التكاليف وتوفير الوصول إلى المعلومات والأخبار إضافة إلى تسهيل الوصول إلى التدريب والتعليم الإلكتروني على الإنترنت التي تساعدهم من خلال أعمالهم المناطين بتأديتها.

APPENDIX S: INTERVIEWS' MAIN QUESTIONS (ENGLISH)

Interview Questions

- Do you think the barriers in the report accurately describe the current situation in your university?
- Do you have other barriers that are important in your university?
- Do you think there is another stakeholder who would be involved in these changes?
- Who is the most important stakeholder for implementing solutions to these barriers?
- Have any of these suggested solutions already been applied in your university?
- Do you have comments on any of the cultural solutions?
- Do you have other cultural solutions?
- Do you have comments on any of the technical solutions?
- Do you have other technical solutions?
- Do you think your university has enough resources to apply these solutions?
- Do you think your university would be willing to apply these solutions?

APPENDIX T: INTERVIEWS' MAIN QUESTIONS (ARABIC)

اسئلة المقابلة الشخصية

- هل تعتقد ان المشاكل التي في التقرير تصف بشكل دقيق و كامل الحاله الحاليه لجامعتك؟
- هل لديك مشاكل اخرى لديها تاثير اكثر على استخدام التقنية في جامعتك؟
- هل تعتقد ان هناك اعضاء مستخدمين اخرين من الممكن ان يؤثروا في المشاكل؟
- هل تعتقد ان هناك اعضاء مستخدمين اخرين في الجامعة لهم تاثير اكبر على العقبات او المشاكل؟
- هل هناك اي من الحلول مطبقه في جامعتك؟
- هل لديك تعليقات على قسم الحلول الثقافية؟
- هل لديك حلول ثقافية اخرى؟
- هل لديك تعليقات على قسم الحلول التقنية؟
- هل لديك حلول تقنية اخرى؟
- هل تعتقد الجامعة لديها الامكانات الكافيه لتطبيق هذه الحلول في جامعتك او الجامعات السعودية الاخرى؟
- هل تعتقد الجامعة لديها الاستعداد لتطبيق هذه الحلول في جامعتك او الجامعات السعودية الاخرى؟

APPENDIX U: CONSENT FOR INTERVIEW (ENGLISH)

CONSENT FORM FOR PARTICIPATION IN RESEARCH

(by interview)

I ……

being over the age of 18 years hereby consent to participate as requested in the interview for the research project on Effective Use of ICT in Saudi Arabian Universities.

1. I have read the information provided.
2. Details of procedures and any risks have been explained to my satisfaction.
3. I am aware that I should retain a copy of the Information Sheet and Consent Form for future reference.
4. I understand that:
   - I may not directly benefit from taking part in this research.
   - I am free to withdraw from the project at any time and am free to decline to answer particular questions.
   - While the information gained in this study will be published as explained, I will not be identified, and individual information will remain confidential.
   - Whether I participate or not, or withdraw after participating, will have no effect on any treatment or service that is being provided to me.
   - I may withdraw at any time from the session or the research without disadvantage.
5. I have had the opportunity to discuss taking part in this research with a family member or friend.

Participant's signature……Date……...

I certify that I have explained the study to the volunteer and consider that she/he understands what is involved and freely consents to participation.

Researcher's name : Fahad Alturise

Researcher's signature……...Date……..

NB: Two signed copies should be obtained. The copy retained by the researcher may then be used for authorisation of Items 8 and 9, as appropriate.

This research project has been approved by the Flinders University Social and Behavioural Research Ethics Committee (Project Number 6096). For more information regarding ethical approval of the project the Executive Officer of the Committee can be contacted by telephone on 8201 3116, by fax on 8201 2035 or by email human.researchethics@flinders.edu.au.

APPENDIX V: CONSENT FOR INTERVIEW (ARABIC)

استمارة الموافقة على المشاركة في البحوث
(عن طريق المقابلة)

أنا .....

عمري اكبر من 18 سنة أوافق على المشاركة في المقابلة للبحث الذي بعنوان الاستخدام الفعال و الامثل لتكنولوجيا الاتصالات و المعلومات في الجامعات السعودية

لقد قمت بقراءة المعلومات المقدمة لدي.

1- وقد تم شرح تفاصيل الإجراءات وأية مخاطر لارتياحي

2- إنني أدرك أنني يجب أن تحتفظ بنسخة من ورقة المعلومات ونموذج الموافقة كمرجع في المستقبل.

3- أنا أفهم أن :

- أنا قد لا تستفيد مباشرة من المشاركة في هذا البحث.
- أنا حر في الانسحاب من المشروع في أي وقت، وأنا حرة في رفض الإجابة عن أسئلة معينة.
- في حين سيتم نشر المعلومات المكتسبة في هذه الدراسة كما هو موضح، لن أكون المحددة ، والمعلومات الشخصية ستبقى سرية.
- ما إذا كان بإمكاني المشاركة أم لا ، أو الانسحاب بعد المشاركة، وسوف يكون له تأثير على أي علاج أو الخدمة التي تقدم لي.
- أود أن تسحب في أي وقت من الدورة أو البحث من دون عيوب.

5- وقد أتيحت لي الفرصة لمناقشة المشاركة في هذا البحث مع أفراد العائلة أو الأصدقاء.

توقيع المشارك ..... تاريخ.....

وأشهد أنني قد شرحت هذه الدراسة إلى المتطوعين ونعتبر أن قالت / انه يفهم ما تشارك بحرية ويوافق على المشاركة.

اسم الباحث : فهد الطريس

الباحث التوقيع..... التاريخ.....

ملحوظة : يجب الحصول على نسختين يوقع. قد ثم نسخ يحتفظ بها الباحث أن تستخدم للحصول على إذن من وحدات 8 و 9، حسب الاقتضاء.

APPENDIX W: ELECTRONIC SURVEY

INFORMATION SHEET

Title: 'Effective Use of ICT in Saudi Arabian Universities'

Investigators:
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Description of the study:
This study is part of the project entitled 'Effective Use of ICT in Saudi Arabian Universities'. This project will investigate the problems or difficulties which universities face and why IT is not being employed effectively. On the basis of this information, I will develop solutions to improve university IT systems, which will positively affect the output of the university. This project is supported by Flinders University School of Computer Science, Engineering and Mathematics.

Purpose of the study:
It is expected that the outcome of the research will enable universities in Saudi Arabia to be more confident when adopting ICT. It will also help the government in designing policies to promote ICT that will have a positive impact on the national education overall. Lastly, this research work will also be useful for other countries (especially in Gulf States, Middle East and Muslim countries with similar traits) in providing guidelines for the adoption of ICT in universities.

What will I be asked to do?
You are invited to attend a one-on-one interview or complete a survey. The interview or survey will ask you about your experience of ICT in universities and your opinion regarding ICT adoption. The interview will take about 10 - 15 minutes and survey about 20 - 25 minutes. The interview will not be recorded, but I will take notes about important points. Completed surveys will be collected in a closed box with a slot in the lid, located in the classroom (for students) or in the school office (for staff).

What benefit will I gain from being involved in this study?
The sharing of your experiences will improve the ICT adoption in Saudi Arabian universities. We are very keen to identify obstacles and challenges so that we can develop strategies for overcoming barriers for ICT adoption. The results of the study will help all parties in ICT adoption to assess their ICT readiness by using the suggested recommendations.

Will I be identifiable by being involved in this study?
We do not need your name and you will be anonymous. Interview notes and survey results will be typed up and stored on a password-protected computer accessible only to the researchers, and will not include any identifying information. Your comments will not be linked directly to you.

Are there any risks or discomforts if I am involved?
The investigator anticipates few risks or discomforts from your involvement in this study, other than the time involved to participate. If you have any concerns regarding anticipated or actual risks or discomforts, please raise them with the investigator.

How do I agree to participate?
Participation is voluntary. You may answer 'no comment' or refuse to answer any questions and you are free to withdraw at any time without effect or consequences. A consent form accompanies this information sheet. If you agree to participate please read and sign the form.

How will I receive feedback?
Outcomes from the project will be summarised and given to you by the investigator if you would like to see them.

Thank you for taking the time to read this information sheet and we hope that you will accept our invitation to be involved.

This research project has been approved by the Flinders University Social and Behavioural Research Ethics

Committee (Project Number 6096). For more information regarding ethical approval of the project the Executive Officer of the Committee can be contacted by telephone on 8201 3116, by fax on 8201 2035 or by email human.researchethics@flinders.edu.au.

Section 1: Information about Your Electronic Devices & Internet Connect...

1. Do you have a personal computer? (Please tick one box only for each option).

	Yes	No
Desktop	◯	◯
Laptop	◯	◯
Smartphone	◯	◯
Tablet computer	◯	◯

2. How old is the personal computer that you use most often? (Please tick one box only).

- ◯ Less than 1 year old
- ◯ 1 year old
- ◯ 2 years old
- ◯ 3 year old
- ◯ More than 3 years old (please specify age) .....

3. How old is your newest computer? (Please tick one box only).

- ◯ Less than 1 year old
- ◯ 1 year old
- ◯ 2 years old
- ◯ 3 years old
- ◯ More than 3 years old (please specify age) .....

4. Do you have access to an Internet connection at home?

- ◯ Yes
- ◯ No

5. What type of Internet connection do you have at home? (Please tick one box only for each option).

	Yes	No
High-speed (ADSL)	◯	◯
Dial-up	◯	◯
Wi-Fi	◯	◯
Mobile phone network (3G)	◯	◯

Other (please specify)

6. Do you have an Email?

- ◯ Yes
- ◯ No

7. How often do you use a computer for the following activities: (Please tick one box only for each option)

	Several times per day	About once a day	About once a week	About once a month	Less than once a month	Never
Email	◯	◯	◯	◯	◯	◯
Study (homework, assignments, projects, etc.)	◯	◯	◯	◯	◯	◯
Entertainment (games, movies, etc.)	◯	◯	◯	◯	◯	◯
Business (accounts, payroll, etc.)	◯	◯	◯	◯	◯	◯
Reading (e-book, e-magazine, etc.)	◯	◯	◯	◯	◯	◯
Social network (Twitter, Facebook, etc.)	◯	◯	◯	◯	◯	◯
Other (please specify)	◯	◯	◯	◯	◯	◯

8. How significant are the following factors in limiting your present and future use of computers and Internet? (Please tick one box only for each option)

	Very Significant	Significant	Somewhat Significant	Not Significant	N/A
Security or privacy concerns	◯	◯	◯	◯	◯
Not enough time	◯	◯	◯	◯	◯
I don't have a computer that I can easily access	◯	◯	◯	◯	◯
Internet connection cost too much	◯	◯	◯	◯	◯
Internet connection unreliable	◯	◯	◯	◯	◯
Not interested in technology	◯	◯	◯	◯	◯
I don't have the technical support I need	◯	◯	◯	◯	◯
Family, culture and authority figure reasons	◯	◯	◯	◯	◯
I don't have the necessary skills	◯	◯	◯	◯	◯
Cost of computers too high	◯	◯	◯	◯	◯
Other (please specify)	◯	◯	◯	◯	◯

Section 2: Information about Your University's Devices & Internet Conne...

9. Do you have access to a university computer? (Please tick one box only for each option).

	Yes	No
I have access to a PC in a student computer suite	◯	◯
I have access to a PC in the library	◯	◯
Other (please specify)	◯	◯

10. How do you connect to the Internet at university? (Please tick one box only for each option).

	Yes	No
Do not have access to the Internet at university	◯	◯
Fixed computer in computer suite or library	◯	◯
Personal laptop connected to wired network	◯	◯
Personal laptop connected to dial-up	◯	◯
Personal laptop or mobile device connected via university Wi-Fi	◯	◯
Other (please specify)	◯	◯

11. Please rate the following aspects of your internet connection at university: (Please tick one box only for each option).

	Excellent	Very Good	Good	Fair	Poor
Reliability	◯	◯	◯	◯	◯
Speed	◯	◯	◯	◯	◯

12. For the following services, please indicate your use of the Educational service: (Please tick one box only for each option).

	Frequent	Occasional	Rare	Very Rare	Never	N/A
Access course material via website	◯	◯	◯	◯	◯	◯
Download/stream lecture video	◯	◯	◯	◯	◯	◯
Submitting student assignments	◯	◯	◯	◯	◯	◯
DO online quiz or exam	◯	◯	◯	◯	◯	◯
Full learning management system	◯	◯	◯	◯	◯	◯
Other (please specify)	◯	◯	◯	◯	◯	◯

13. For the following services, please indicate your use of the communication service: (Please tick one box only for each option).

	Frequent	Occasional	Rare	Very Rare	Never	N/A
University email system	◯	◯	◯	◯	◯	◯
Discussion board	◯	◯	◯	◯	◯	◯
Messaging system (SMS, etc.)	◯	◯	◯	◯	◯	◯
Social network (Twitter, Facebook, etc.)	◯	◯	◯	◯	◯	◯
Other (please specify)	◯	◯	◯	◯	◯	◯

14. For the following services, please indicate your use of the administrative service: (Please tick one box only for each option).

	Frequent	Occasional	Rare	Very Rare	Never	N/A
University website	◯	◯	◯	◯	◯	◯
Enroll topics online	◯	◯	◯	◯	◯	◯
Publish student grades online	◯	◯	◯	◯	◯	◯
Online payment (printing, parking, etc.)	◯	◯	◯	◯	◯	◯
ID student smart card	◯	◯	◯	◯	◯	◯
Building access system	◯	◯	◯	◯	◯	◯
Other (please specify)	◯	◯	◯	◯	◯	◯

15. For those ICT services that are available at your university, please indicate how effective you think they are: (Please tick one box only for each option).

	Very effective	Mostly effective	Nor effective or ineffective	Mostly ineffective	Not at all effective
Educational Services	◯	◯	◯	◯	◯
Communication Services	◯	◯	◯	◯	◯
Administrative Services	◯	◯	◯	◯	◯

Section 3: Information about Your Computer Skills

16. Please rate your skill level in each of the following types of software: (Please tick one box only for each option).

	Expert	Competent	Moderate	Beginner	Non User
Windows or other operating systems	◯	◯	◯	◯	◯
File handling (creating/opening files, etc.)	◯	◯	◯	◯	◯
Email	◯	◯	◯	◯	◯
Instant messaging	◯	◯	◯	◯	◯
Web surfing	◯	◯	◯	◯	◯
Spreadsheets (Excel, etc.)	◯	◯	◯	◯	◯
Word processing (Word, etc.)	◯	◯	◯	◯	◯
Presentation software (PowerPoint, etc.)	◯	◯	◯	◯	◯
Web search engines (Google, etc.)	◯	◯	◯	◯	◯
Graphics (Photoshop, Flash, etc.)	◯	◯	◯	◯	◯
Creating web pages (Dreamweaver, FrontPage, etc.)	◯	◯	◯	◯	◯
Online library resources	◯	◯	◯	◯	◯

17. How did you get this level of skill? (Please tick one box only for each option).

	Very Significant	Significant	Somewhat Significant	Not Significant	N/A
Courses in High School	◯	◯	◯	◯	◯
University's courses	◯	◯	◯	◯	◯
Workshops provide by university	◯	◯	◯	◯	◯
Commercial training courses	◯	◯	◯	◯	◯
Self-directed learning	◯	◯	◯	◯	◯
More practice	◯	◯	◯	◯	◯
Friends or colleagues	◯	◯	◯	◯	◯
Other (please specify)	◯	◯	◯	◯	◯

18. How would you rate your overall computer skill level using university systems? (Please tick one box only).

- ◯ Expert
- ◯ Competent
- ◯ Moderate
- ◯ Beginner
- ◯ Non Use

Section 4: Information about Your Opinion

19. Which one of the following statements best describes your attitude to adopting new technologies? (Please tick one box only).

- ◯ I am sceptical of new technologies and use them only when I have to
- ◯ I am usually one of the last people I know to use new technologies
- ◯ I usually use new technologies when most people I know do
- ◯ I like new technologies and use them before most people I know
- ◯ I love new technologies and am among the first to experiment with and use them

20. Which one of the following statements best describes your preference with regard to the use of technology in your classes? (Please tick one box only).

- ◯ I prefer taking classes that use no information technology
- ◯ I prefer taking classes that use limited technology features
- ◯ I prefer taking classes that use a moderate level of technology
- ◯ I prefer taking classes that use technology extensively
- ◯ I prefer taking classes that are delivered entirely "on-line" with no required face-to-face interactions

21. How have you benefited from the use of ICT in your study. (Please tick one box only for each option).

	Strongly agree	Agree	Neither	Disagree	Strongly disagree
ICT promotes active engagement in class activities	◯	◯	◯	◯	◯
ICT improves learning and knowledge about study area	◯	◯	◯	◯	◯
ICT saves time in completing assessable work	◯	◯	◯	◯	◯
ICT provides access to more information and resources	◯	◯	◯	◯	◯
ICT helps manage study activities	◯	◯	◯	◯	◯
Using ICT develop ICT skills for the workplace	◯	◯	◯	◯	◯

22. Please suggest other ways in which use of ICT has benefitted your study.

23. Rate the following statements on how effective they would be for increasing your use of ICT at home. (Please tick one box only for each option).

	Very effective	Effective	Neither	Ineffective	Strongly ineffective
More reliable Internet connections	◯	◯	◯	◯	◯
Cheaper Internet connections	◯	◯	◯	◯	◯
Wider availability of wireless Internet connection	◯	◯	◯	◯	◯
Information for parents and authority figure about positive aspects of ICT	◯	◯	◯	◯	◯
Better support from computer and Internet providers	◯	◯	◯	◯	◯
More information about setting up and maintaining home ICT	◯	◯	◯	◯	◯
Active promotion of the benefits of using IT facilities in university study	◯	◯	◯	◯	◯
Government legislation to protect users from cybercrimes	◯	◯	◯	◯	◯

24. Please suggest other changes that you think would increase your use of ICT at home.

25. Rate the following statements on how effective they would be for increasing your use of ICT at university. (Please tick one box only for each option).

	Very effective	Effective	Neither	Ineffective	Strongly ineffective
More networked PCs and student IT suites	◯	◯	◯	◯	◯
Longer opening hours and weekend opening for IT suites	◯	◯	◯	◯	◯
Wider availability of wireless connection	◯	◯	◯	◯	◯
Readily available training about the use of ICT systems	◯	◯	◯	◯	◯
Early introduction of ICT training into course programs	◯	◯	◯	◯	◯
Better support from university ICT staff	◯	◯	◯	◯	◯
Strong encouragement from faculty members to use ICT tools	◯	◯	◯	◯	◯
Active promotion of the benefits of using IT facilities in university study	◯	◯	◯	◯	◯

26. Please suggest other changes that you think would increase your use of ICT at university?

27. If you have any other comments or insights about your experience with ICT at home or university, please feel free to share them with us below.

Section 5: Personal Information

28. Which city or region does your family come from?

29. What is your class standing? (Please tick one box only).

- ◯ First year
- ◯ Second year
- ◯ Third year
- ◯ Fourth year
- ◯ Graduate study

30. Where do you live while attending university? (Please tick one box only).

- ◯ On campus
- ◯ Apartment
- ◯ Share house
- ◯ With my family

Other (please specify)

31. What is your gender?

- ◯ Male
- ◯ Female

32. What is your age? (Please tick one box only).

- ◯ 18 – 24 years
- ◯ 25 – 29 years
- ◯ 30 – 34 years
- ◯ 35 – 39 years
- ◯ 40 – 44 years
- ◯ 45 years and over

APPENDIX X: QUESTIONNAIRES VALIDATION FORM (ARABIC)

الاستخدام الفعال و الامثل لتكنولوجيا الاتصالات و المعلومات في الجامعات السعودية

استماره تقييم للإستبيان للبحث المبدئي

من فضلك قراءة كل جزء في الاستبيان, و اذا وجدت أي عبارة غير واضحة, الرجاء وضع علامة عليها. أيضا من خلال قراءتك وإجابتك للإستبيان, الرجاء كتابة أي عبارة غير واضحة أو غامضة في الفراغ المتاح لكل جزء من الاستبيان أو كتابة أي اقتراح أو توصية لتحسين الإستبيان.

القسم الاول: معلومات عن اجهزة الحاسب و اتصال الانترنت الخاصة بك

عبارات غير واضحة:

_____

_____

_____

اقتراحات:

_____

_____

_____

القسم الثاني: معلومات عن اجهزة الحاسب و اتصال الانترنت في جامعتك

عبارات غير واضحة:

_____

_____

_____

اقتراحات:

_____

_____

_____

القسم الثالث: معلومات عن مهاراتك في الكمبيوتر

عبارات غير واضحة:

_____

_____

_____

اقتراحات:

_____

_____

_____

القسم الرابع: معلومات عن وجهة نظرك

عبارات غير واضحة:

اقتراحات:

القسم الخامس: المعلومات الشخصية

عبارات غير واضحة:

اقتراحات:

APPENDIX Y: FINAL SOLUTIONS STRATEGIES REPORT

Effective Use of ICT in Saudi Universities

Problems and solution strategies

Introduction

Compared with other Gulf State universities, Saudi Arabian universities experience many problems in effectively implementing and using ICT. Using surveys and interviews, we obtained data from 536 students, 142 faculty members, and 121 administrative staff in 10 Saudi universities and 5 Gulf States universities. The data shows that the Gulf States universities get considerably more benefit from IT than the Saudi universities, despite all the countries concerned having similar budgets, sharing similar cultures and having good infrastructure.

As a result of current problems, many Saudi universities still utilise paper-based processes that cause delays and lead to other difficulties. For example, faculty members lose much time in executing teaching duties such as marking, preparing lectures, and administrative work, and they experience communication problems as well. Moreover, students endure many problems with enrolments, contact with staff, familiarity with technology and other issues. Finally, administrative personnel lack skills to deal with technological issues and their qualifications for using IT are low or non-existent. Also, Saudi universities staff suffer from the lack of awareness and not being serious about their workplace duties and obligations.

Some problems emerge as a consequence of other issues such as lack of motivation. It is a consequence of many problems in universities such as lack of ICT infrastructure, lack of training, lack of motivation and lack of leadership. This report describes the main problems identified and proposes potential solutions. The emphasis is on solutions that are practical to implement in the affected universities. The two main types of solutions are cultural and technical in character. It is very important to implement solutions so that the maximum benefit is obtained for all parties involved. This research also draws on the results of previous studies.

The overall goal for the project is find solutions that will improve the situation in Saudi Arabian universities, although it is likely that such solutions may also help other developing countries facing similar challenges. The solutions proposed here have been validated by interviews with 17 ICT professionals from 10 Saudi universities.

Problems and Challenges

From the survey data and interviews, we identified three main problem areas and associated challenges that are preventing effective use of IT in Saudi universities.

Inadequate Infrastructure Management

Many newly established universities lack necessary ICT infrastructure, which should incorporate student computer laptops, access to desktop devices and office-based Internet, Wi-Fi internet connections, smart classrooms, PCs for staff, and other software devices. Some new universities have acquired infrastructure as a consequence of merging with an existing university, but even then managing these problems is still critical, and leadership is frequently lacking in the IT department. Good ICT management is especially challenging for universities with several campus sites; some universities have more than 20 campuses spread across different cities, which requires large budget outlays to keep the infrastructure functioning.

Shortage of Qualified Staff

University personnel often lack skills in utilising ICT software and hardware, largely because of a shortage of training. Even where faculty members and other staff have good ICT skills, the poor skills of co-workers cause delays and inefficiency because the large gulf between skilled and unskilled colleagues results in duplicated work and communication difficulties. Furthermore, the lack of ICT skills in teaching staff has a 'knock on' effect for students who in turn lack skills because staff do not encourage them to use ICT in their studies or other administrative tasks.

Low Motivation

Many staff do not feel motivated to engage with available ICT technologies or systems. Often, faculty members and administrative staff do not use IT in their work because they see such work as the responsibility of others, or because they see a lack of guidance from university decision-makers or policy-makers. They see the workplace as lacking the kind of support that would encourage them to use new technology or update their skills. Poor motivation in employees and poor local work culture can have serious effects on improving skills and using IT in the workplace. For example, a common problem is that faculty members with high teaching loads are not motivated to spend additional time to acquire new ICT skills, especially if they see their decision-makers as unsupportive.

Stakeholders

Solutions to these problems must be linked to university policies and practices in order to be effective. The most important people who can help with these problems are university managers and directors who have the authority and responsibility for implementing ICT, technical staff, external partners who will implement and support the ICT infrastructure, and of course the teachers, students, and administrative staff who will use ICT in their day-to-day work.

Decision makers (internal)

Decision-makers should choose a qualified and highly experienced IT team that can develop both basic and more advanced ICT solutions. The most difficult step is changing from an old system to a new one and this means implementing change at all levels in the university. IT leaders should ensure that staff are appropriately trained to deal with hardware and software issues. The decision makers include university presidents, directors, faculty or departmental heads, deans and senior administrative staff.

Technical support (internal)

IT departments have many duties and they will have to replan their functions using qualified and experienced people. ICT infrastructure will have to be reconfigured so that it is used in a more effective way. Moreover, the Internet should be made available everywhere with the appropriate restrictions in place. Good technical support will help users to use services in all campuses, schools, departments, libraries and labs. Technical support includes IT departmental staff, IT staff in the schools and IT staff in administrative departments.

Teachers (internal)

Faculty teachers should be active by using ICT much more effectively. They must encourage students to use technology such as email for contact, access to electronic materials, submit assignments electronically, and learn about other features of the online learning management system. Teachers include full-time and part-time faculty members and training centre staff.

Students (internal)

Students should be encouraged by faculty members to use available ICT services throughout their university life. The focus of ICT services should be to support students and facilitate the

completion of their study. Students include those studying at all levels -- Bachelor, Master and PhD – and those attending classes either on campus or remotely.

Administrators (internal)

Administrative staff should understand the advantages of working electronically compared to paper-based systems. Administrators include all staff working at a university, such as full-time and part-time employees, and contract workers.

Private sector bodies and parastatal organisations (external)

Working relationships should be established with private sector bodies and parastatal organisations who have expertise to support efforts by universities to use ICT to facilitate education. Private sector bodies include communication companies, educational technology companies, information and network technology companies and ICT training companies. Parastatal organisations include the Communications and Information Technology commission, the King Abdulaziz City for Science and Technology, and the National Centre for E-Learning and Distance Learning.

Solution Strategies

The proposed solution strategies can be categorized as either cultural solutions, which focus on the people involved and the way they work, or technical solutions, which apply technology to enable and support that work. Neither type of solution is sufficient without the other. Without technical support, the benefits of ICT are unavailable. Without cultural support, the money spent on implementing ICT is likely to be wasted.

Cultural solutions are important to ensure that solutions are effective and that workers will be motivated to adapt their work practices. Technical solutions are important because they enable new ways of working and can quantify the benefits of change. Each type of solutions supports the other; both must be implemented together.

Attractive incentives for all Stakeholders (cultural)

Universities should boost stakeholder motivation by providing attractive incentives for improving workplace practices in the area of ICT. Different incentives will appeal to different people; universities should consider a range of incentives, such as salary bonuses, public acknowledgement of achievement, or workload considerations. Universities have large government budgets and the money should be spent on training to learn incentive-related skills.

This means in effect encouraging staff to improve their workplace attitudes and skills through the process of self-learning. Staff must be encouraged as much as possible to attend training courses and improve their sense of motivation and how to complete procedures, processes, routines, etc. that are IT-based. The effectiveness of incentives must be evaluated by university decision-makers in light of staff members' age, qualifications, experience and what will be required in the future.

Up-to-date policies and rules (cultural)

Government and university decision makers should update all university missions' statements, policies and rules concerning IT and where and how it is used. Universities have to show staff these policies and rules and they should be worded in ways that give them the incentive to improve their IT skills. Penalties should be introduced if staff do not attain the bare minimum of IT skills such as using email, organizing desktop spaces, online folders, etc. The university authorities should monitor staff usage and the specified minimum IT services that are required in university teaching and administrative work. This will be fairly easy because most staff are young and faculty members have worked or studied in overseas universities, such as in the USA, UK and Australia where IT usage is routine. Resistance against these policies and rules may emerge from older staff who should be given time to adjust to the newer policies and procedures.

Comprehensive usage monitoring (technical)

A comprehensive ICT usage monitoring system could track staff and student use of university ICT infrastructure, which would help university managers and IT leaders to identify which sectors of the university are not making effective use of ICT services. Information gathered by the monitoring system can be used to support cultural solutions; for example it could identify areas where incentives are not working well, or circumstances that cause policies to be ineffective. As an added benefit, the monitoring system can also serve to identify breaches of safety and security.

High-quality ICT training (technical)

Training is an easy way to develop and update skills for staff and students. Universities should offer training courses to suit a wide range of needs, and accessible to users with a wide range of skill levels from novice to expert. Staff should be required to demonstrate competence in the skills needed for their situation, with regular assessments to ensure skills are up to date and the results used to direct users to the training courses appropriate to their current skill level. To

be effective, courses must be designed by specialists such as those employed or contracted by IT companies that are familiar with university requirements.

Universal access to ICT infrastructure (technical)

Universities should make ICT resources available to all staff and students. Where possible, access should be provided to the full resources of the Internet. If such access is not possible or not desirable, for example in campuses that are far from the main campus or that cannot afford universal access, a private staff-only Intranet should be implemented instead. Universal access to ICT infrastructure will encourage staff involvement in communication and collaboration, save time and reduce costs, provide access to business information and news, and facilitate on-line training and e-learning in the user's work context.